COAL AGE

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# Service That Is Appreciated

A LARGE coal-mining company recently came into the market for a certain class of mining machine. The concern had a number of such machines in operation. It had not adopted any particular type, however, and as a result each salesman of this kind of equipment felt as if he had at least a good chance to get some of this company's business.

*IF the thought here presented is carried out by manufacturing and mining companies, dollars will be added to dividends.*

When unexpected conditions arose that made it necessary for the coal company to purchase six machines, the mine manager decided that the time was ripe for standardizing on some special make. Therefore, instead of waiting for the periodical visits of the various salesmen, he sent all the manufacturers copies of his specifications and set a date for consideration of the bids.

After tabulating the replies and listening to the arguments of the salesmen, he called in all of his superintendents and gave each one a chance to state his preference. The propositions submitted by two of the manufacturers were similar. The manager knew that both of these types were giving satisfactory service at his plants. He also knew that he had about an equal number of the two makes of machines. One manufacturer, however, offered a little better delivery than the other, and the manager had about decided to give his order to the concern that was able to ship promptly.

The superintendents, however, were unanimous in their choice of the other machine. The manager asked each of them to give a personal reason for his preference. The responses brought out the fact that the firm whose product they chose had a plan of following up all installations much more closely than the other concern. As a consequence of this policy the men in the operating department of the mining company were able to get better satisfaction from these machines.

The manager saw the point, and the following day placed his order with the manufacturer that had established a reputation for giving service.

At the next meeting of his board of directors he gave his reason for purchasing the type of machine that had been decided upon. After he had explained the situation, the mining company's sales manager jumped to his feet, suddenly possessed of an idea. He stated that he had found the way out of many of his difficulties at last. He pointed out that if it was so profitable to follow up sales of machinery, there was no doubt that it would be just as profitable to follow up coal sales.

The very next day he employed an expert fireman to travel around and inspect the boilers that were operated by companies using his company's coal regularly. The instructions he gave his new employee were simple in the extreme. They were: "See that our customers are getting everything out of our coal that there is in it."

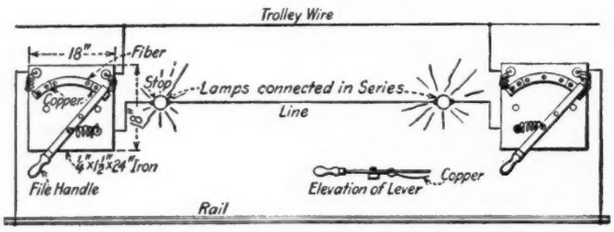
# Ideas and Suggestions

## Signal Lights for Mine Locomotives

By R. Thomas Kirk*

The accompanying diagram shows a system of signal lights employed to safeguard the men who operate mine locomotives. As will be noticed from the illustration, the switchboards are inexpensive, considering the important part they play in the matter of safety.

Referring to the diagram, it will be seen that only one conductor is necessary; and this can be made of an old burned-out field coil or, better yet, a No. 18 B. & S. insulated wire. The signal lights are manipulated as follows: When an incoming locomotive passes the first switchboard, the motorman throws the lever and thus opens the circuit, thereby blocking the road. On reaching the next switchboard, he throws its lever, which closes




A PRACTICAL SYSTEM OF SIGNAL LIGHTS

the circuit, causing the two 125-volt lamps to burn and showing the road is clear for following locomotives.

The lights should be placed close to a siding, so that the motorman can clear the road for other locomotives. It should be noticed carefully that the lights are so arranged that they burn when the road is clear and are out when the road is blocked.

Each switchboard can be made of a well-seasoned board or an old piece of slate or marble and should be placed on a timber in some convenient place, so as to be within easy reach of the motorman.

The system of lights just described is being used efficiently in both the Barker and Glendon mines of the Federal Coal Co., of Straight Creek, Ky., each light doing away with the services of a trapper boy.

## A Uniform Coal Contract

By J. L. Boyd†

For some time past the need of a uniform coal contract has been apparent, and efforts have been made to construct one that will be practical and fair, covering all points that might become an issue between the seller and the purchaser. The accompanying form is one that will, in all probability, be adopted by all the coal interests in the southeastern Kentucky and Tennessee fields.

This form appears to be as brief as is possible, to eliminate any misconstructions, and is intended to provide for all ordinary or usual contracts. While it may not fit contracts of a special nature, such as for coal

**COAL CONTRACT**

Knoxville, Tenn., ..... 191..

....., having an office and place of business in.....

hereinafter called "The Coal Company," hereby sells to .....

.....of .....

hereinafter called "The Purchaser," the quantity, kind, grade or size of coal indicated herein, to be shipped during the next .....months following the date hereof, which the Purchaser buys and will pay the price per ton of 2000 pounds stipulated herein below:

| | No. cars | No. tons | Kind | Grade | Price f. o. b. ..... |
|---|---|---|---|---|---|
| Quantity, kind, grade and price | | | | | |

to be shipped as follows:

**Shipping instructions**

**Qualification** PROVIDED, however, that this sale and purchase contract in its entirety is made subject to the conditions, terms and stipulations herein set forth:

**Conditions effecting performance and liability** (a) After the exercise of due diligence on the part of the Coal Company, no liability shall rest with it for failure to make shipments of coal under this contract, as ordered, stipulated or required by the Purchaser, if prevented by mining or labor troubles, shortage of railway equipment, accidents or any other unavoidable causes, and such deficit of the Purchaser's requirements as may result therefrom shall be considered as eliminated from this contract.

**Relation contracts bear to each other** (b) This contract, with all other existing contracts and orders accepted by the Coal Company for like kind, grade or size of coal, to be shipped to other persons, firms or corporations, shall have concurrent rights as to shipments; and likewise any subsequent sales of coal to others shall have concurrent rights with this contract, provided that such subsequent sales, together with all other existing contracts and orders as of this date, do not exceed normal output or supply of the Coal Company.

**Division of Coal during periods of shortage** (c) In the event of a reduced or restricted output of mine or mines producing the coal designed herein which may prevent the Coal Company from furnishing the full requirements of the Purchaser under this contract, the Coal Company shall ship the Purchaser while such condition prevails, such percentage of the available output of the mine or mines producing the coal designed herein, as will be proportionate to the relation that the Purchaser's requirements as stated herein bears to all of the Coal Company's obligations.

**Weights Governing Settlement** (d) All shipments under this contract are to be paid for according to the weights at mines when track scales are used for obtaining such weights, otherwise according to railroad weights at the first weighing station following delivery to carriers.

**Conditions effecting change in price** (e) The price or prices to be paid for coal specified in this contract are based upon the present wage scale, and in the event of an increase or decrease of said wage scale during the life of this contract, the price or prices specified herein shall be increased or decreased to the same extent.

**Terms of payment** (f) Payment for all coal shipped under this contract shall become due and payable at the office of the Coal Company, in Knoxville, Tenn., on the first day of the month following month of shipment, but settlement may be deferred until the tenth day of the month following month of shipment unless notice is given to the contrary. Failure to comply with these terms of payment may, at the option of the Coal Company at any time thereafter render this contract null and void as to all other and further shipments of coal, and this right shall not be waived by the acceptance on the part of the Coal Company of any delinquent payment or payments, or by further shipments of coal to the purchaser thereafter.

**Suspension of contract** (g) In the event of labor troubles, accidents or other unavoidable causes preventing the purchaser from receiving or using coal designed and purchased under this contract, after due notice to the Coal Company, shipments of coal may be suspended during such disability and to that extent eliminated from this contract.

.....

By .....

.....

By .....

SPECIMEN CONTRACT; ACTUAL DIMENSIONS, 7x11 IN.

sold on the merit basis, or providing for specific performance, the general provisions given might properly apply to contracts of that character as well as the ordinary coal contracts.

## An Underground Air Lift

By Thomas Hogarth*

The following is a description of a simple contrivance that I devised for the purpose of doing away with an underground pump. Similar devices have doubtless been used by many mining men, but at the same time there may be others who have never seen them, or perhaps have never heard of them.

The water in a mine of which I took charge was bad. The pumps and the pipes all had to be wood lined,

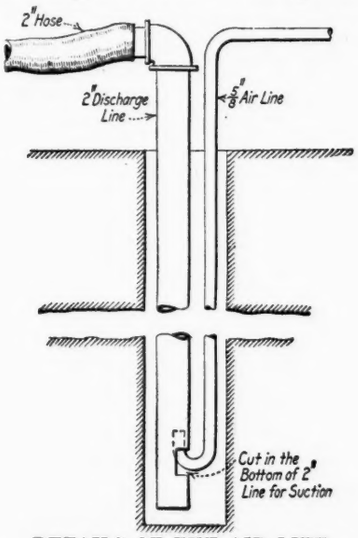
*Chief electrician, Federal Coal Co., Straight Creek, Ky.

†Manager, the Proctor Coal Co., Knoxville, Tenn.

*Heilwood, Penn.

otherwise they would only last a week or two before they were eaten out. In one place in particular the water was extremely troublesome, since it would eat the water end of the pump away in two weeks. The amount of water encountered at this point was not large, being just about sufficient to keep a 2-in. pipe flowing full. I suppose the management did not think it worth while to put in a wood-lined pump and pipes for this small quantity of water, yet it was a constant source of expense, owing to the necessity of changing the pipe and getting new pumps.

It occurred to me one day that an air lift might be employed for handling this water. I brought this device to




DETAILS OF THE AIR LIFT

the attention of the general superintendent, and he assured me that if the trial lift be made to work he would gladly purchase brass pipe of which to make a permanent one.

The low place in the heading where the water collected had been partly filled with dirt. I secured a 20-in. terra-cotta pipe and put it over the spot where I wanted the hole dug for the air lift. The dirt was then removed from the inside of this pipe, and in this way it was lowered into the débris. Before reaching solid rock, however, some old timber was encountered. It was necessary, therefore, to remove the terra-cotta pipe and cut away this timber, after which the pipe was lowered as before until solid rock was struck.

A 4-in. drill was then made from an old puncher pick on the end of which a 1¼-in. pipe was welded. This made a fairly good drill for the purpose. With this drill and a piece of 2-in. pipe with a bolt in the bottom used as a sludge pump, a 4-in. hole 12 ft. deep was easily put down by two men.

When this drillhole was completed I took a 2-in. pipe and about 8 in. from the bottom I cut a hole 6 in. long and half the diameter of the pipe in depth. On the upper end of the pipe I placed an elbow into which a nipple was screwed, this in turn connecting with a piece of hose. A length of ⅝-in. pipe was also secured and the end formed into a sharp return bend, this end hooking into the opening in the lower end of the 2-in. pipe. The whole was then lowered into the hole, after which the upper end of the ⅝-in. pipe was connected to an air line that had been employed for driving the pump that was formerly in use at this point.

When all was completed the air was turned on. The effect was surprising. Water was thrown all over the place. The air was consequently throttled down to about half a turn of the ⅝-in. globe valve. The device then practically threw a steady stream of water, completely filling the 2-in. pipe.

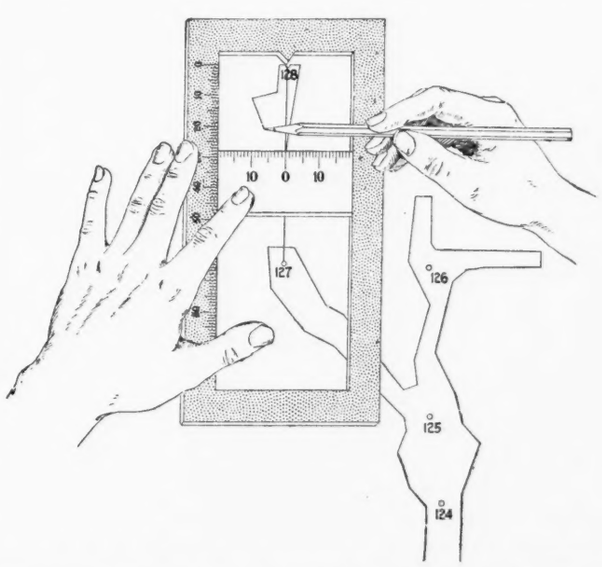
I never got the brass pipe that had been promised, but when the iron pipe eats away it does not take more than about 2 hr. to put in a new one. Of course, this is much more satisfactory and cheaper than buying and placing new water ends on the pump or furnishing new section and discharge lines.

Where compressed air is available, the method that has just been described is extremely handy for removing water from low places. I do not know, however, how it would work if the discharge line was a long one.

## The Zulch Offset Scale*

By William G. Zulch

The device shown in the sketch is intended for the rapid mapping of irregular lines such as mine drifts. The construction of the scale is extremely simple. A frame is made of ¼-in. sheet iron on which a scale is glued or stamped. A movable scale of rectangular form is made from an old celluloid triangle to slide within the iron frame. The course of the main traverse is first plotted (127 to 128 in the sketch), the 0 of the movable scale being over 127 and the distance to 128 being laid of on the fixed scale. The movable scale is then moved up to 0 and the corners of the drift are plotted from the movable scale. The notes for this read 3 ft. to the right and 2 ft. to the left at 128. The movable scale is then moved down to 9 and the note 2.5 ft. right and left is plotted. These points are connected to form the outline of the drift. When any considerable amount of mine mapping is to be done, this scale will prove to be a time saver.




PLOTTING IRREGULAR MINE WORKINGS ON MAP WITH THE ZULCH OFFSET SCALE

*From "Engineering and Mining Journal."

# Conditions at the Reserve Mine, Nanaimo, B. C.

By James Ashworth*

*SYNOPSIS—Many accidents due to carelessness and disregard of safety and the requirements of the mining laws. The fatal explosion of May 27, 1915, at the Reserve Mine, Nanaimo, B. C., is a prominent example of the utter disregard of the provisions of the Coal-Mines Regulation Act in two respects as explained by Mining Engineer Ashworth, who asks some pertinent questions.*

The fact that the origin of a mining disaster is more frequently than otherwise due to "taking a chance," has been proved so often that this may be assumed the cause with some certainty wherever the saving of time and labor is any object.

Selfish convenience often leads a man to do the thing that he ought not. Thus "taking a chance" may be represented by a man firing a shot under known dangerous conditions, where not only his own safety but that of the whole mine depends solely on the fact that he is using a "permitted explosive." Again, a man may prop a mine door open to give him more air or save himself trouble and forget or fail to shut it.

One of the most fruitful causes of accidents, however, is from falls of roof. A miner may be perfectly well aware that he should not delay to set a prop under a bad piece of roof, but put it off to a more convenient time and, as a result, is killed or maimed. Such neglect is more noticeable when it occurs in mines where systematic timbering is enforced by government mines regulation acts, as in the Canadian provinces.

There are, however, other instances where both the government and the colliery owners and officials are equally to blame. One such case is clearly cited in the British Columbia Minister of Mines' Report for 1915. In that instance, a serious explosion had occurred at the Reserve Mine of the Western Fuel Co., Nanaimo, B. C., May 27, 1915, when 22 men were killed and another man seriously burned.

The Reserve Mine had two shafts, a downcast and an upcast, placed at a considerable distance apart. Each of these shafts was divided into two rectangular compartments, in the larger of which two cages were operated. The other compartment, in No. 2 shaft, 10x10 ft. in the clear, served as an upcast for the return current. This compartment, at the surface, was covered by heavy wooden doors, which protected the fan from destruction in the event of an explosion in the mine. A wooden partition separated the winding compartment from the smaller upcast. At the bottom of the shaft this winding compartment was extended so as to allow room for the landing of mine cars.

Access to the inside roadways from No. 2 shaft was through a single slide door, and when this door was open No. 2 shaft became both a downcast and an upcast. Owing to this short-circuiting of the air current, the mine was frequently without air for a time, until the door was again closed. The explosion of May 27, 1915, damaged the woodwork separating the compartments, which short-circuited the air, and as a consequence two men and two horses were smothered by the afterdamp of the explosion.

At the inquest attention was called to the danger of this arrangement, but no practical steps were taken either by the management or by the inspectors of mines. Neither the minister of mines, the Hon. Sir Richard McBride, nor his successor, the Hon. Lorne A. Campbell, took any steps to have the thing remedied, although the rules of the Coal-Mines Regulation Act are very distinct in this regard, Sec. 22 reading as follows:

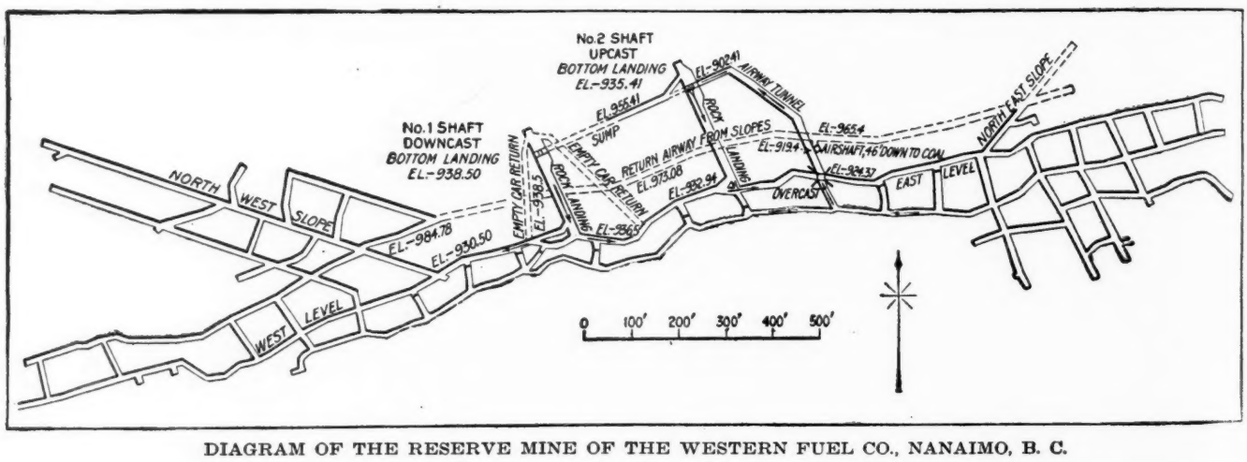



DIAGRAM OF THE RESERVE MINE OF THE WESTERN FUEL CO., NANAIMO, B. C.

22. Where two or more shafts are required pursuant to section 20 of this act, no mine or any portion thereof shall be ventilated by a separate intake and return airway within the area of any one shaft or permanent opening, or maintained by any midwall, air pipe or any other separate division within such shaft; but separate shafts separated by not less than 75 ft. of natural strata shall be used for the intake and return airways respectively:

Provided, that nothing in this section shall conflict with the exemptions as to single shafts as set forth in Sec. 26 of this act:

And provided further, that the Minister may grant such exemptions as he may see fit to mines already opened and in operation, or where by reason of the faulty nature of the seam or the limited area of available coal remaining it would be inexpedient to enforce compliance with the said Sec. 20.

In the 1915 report of the British Columbia Minister of Mines, a plan of the mine, dated February, 1916, is added and described as "showing the ventilating

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scheme." This plan, here reproduced from that report, shows, as far as the No. 2 shaft is concerned, that the housing and slide door at the bottom of the winding compartment had been taken out and the return air made to enter the 10x10-ft. upcast compartment through a tunnel, at a point 33 ft. above the bottom landing. This tunnel was in course of driving at the time of the explosion. The winding compartment is distinctly shown as a downcast and, therefore, if the partition in it had been damaged by a previous explosion or other cause, the ventilation would become short-circuited in part at least.

There are only two conditions in the British Columbia Coal-Mines Regulation Act that give a limited consent to this arrangement, and they are contained in sec. 26 (1), which refers to the opening of a new mine where not more than 20 persons are employed underground at the same time, and (2) in a "proved mine," by the exemption in writing by the minister of mines for specific reasons, neither of which apply in this case.

Minister of Mines Campbell's report in no way explains why this nonobservance of the rules of the Mines Regulation Act was permitted to continue, nor in what way it is possible to fulfill the provisions of sec. 20, which requires that "distinct means of ingress and egress be available to the persons employed in such seam," and sec. 21 that "proper apparatus for raising and lowering persons and for their ingress or egress at each such shaft or outlet where necessary shall be kept on the works belonging to the mine; and such apparatus, if not in actual use, shall be constantly available for use."

At the No. 2 shaft, the 10x10-ft. upcast compartment is not fitted for the raising or lowering of persons. The question arises, therefore, Why should the owners, agents and managers of this mine be permitted to thus disregard the provisions of the rules of this act? And, also, Why should the Government Mines Department, represented by the ministers of mines and the mine inspectors, be a party to such proceeding?

The cost of properly housing-in the whole of the top of the shaft would be considerable; but, on the other hand, the alterations would make the whole of the area of the shaft available to act as an upcast and would be in all respects safer and conform with the rules of the mines act. This case seems to be one of those where someone's idea of "convenience" has taken the place of "safety first."

# Economical Bituminous Coal Storage

By Horace Goldstein*

*SYNOPSIS—Three general methods of storing and reclaiming coal are in common use. An estimate of the expense of operation of the simplest system as compared with a similar estimate for 18 months ago shows that it costs somewhat over 21 per cent. more to store coal now than formerly.*

The simplest method of storing bituminous coal is to employ mechanical means whereby with a minimum initial cost the least number of men are employed to handle a given amount of coal through a definite cycle. The question that is of the greatest interest to an owner is, What does it cost per ton to handle coal at my plant?

There are so many factors that enter into this problem that each case must finally be determined on its own conditions, and in a general discussion special characteristics cannot be considered. Some of these features are the initial cost of the site and preparation of the ground, which may include grading, drainage, piling, rail connections, dredging, etc.

The cost of actually handling the coal on a prepared site is a more or less fixed factor for a given locality. This figure can be applied to any other locality by substituting the costs, rates of interest, wages, etc., prevailing there.

Without doubt the method of handling coal which is most economical, simple and flexible is by means of a large locomotive crane. This crane should be equipped with a long boom fitted with and arranged to handle a good-sized clam-shell bucket. Such a crane should be approximately of the following dimensions:

| | |
|---|---|
| Length of boom | 110 ft. |
| Size of bucket | 5 cu.yd. |
| Gage of tracks | 19 ft. |
| Number of four-wheel trucks | 4 |
| Weight approximately | 225,000 lb. |

*299 Broadway, New York City.

There are different ways of bringing coal to the storage site and within the reach of the crane, and the location of the property has a direct bearing on the method to be adopted. The most common arrangements are: (1) By means of railroad cars (inland storage); (2) by boats, unloading tower and cable-car system; (3) by boats, crane and cable-car system.

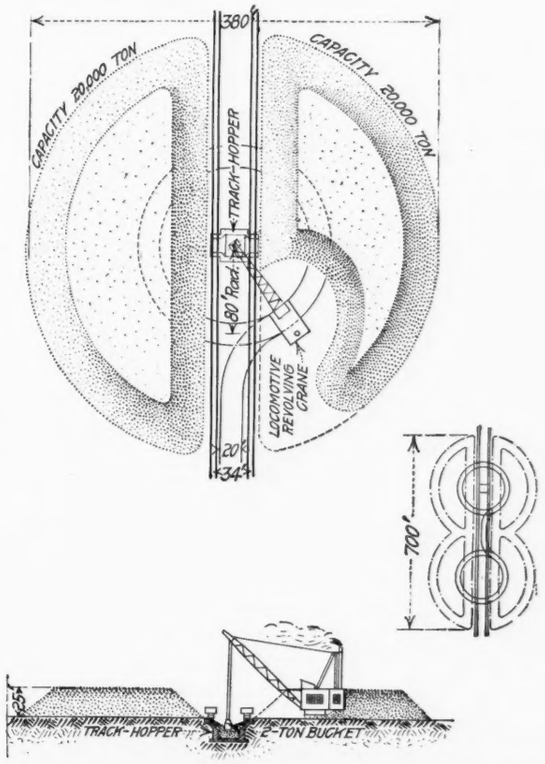



FIG. 1. STORAGE WITH SINGLE HOPPER AND ONE-TRACK LOOP

The following is a general description of these systems, but the cost of handling is given for the first method, as it is the simplest and can readily be modified to suit the other cases.

1. The coal is delivered at the site in hopper bottom cars on two parallel tracks at such a distance apart that a large receiving, or track, hopper can be located between. The center to center distance of tracks is usually made about 34 ft. The railroad tracks are carried over the track hopper by means of heavy track girders, and the coal is allowed to fall by gravity from the cars to the hopper.

The tracks are built on a grade, the loaded cars being placed beyond the track hopper; and as each car is emptied it is allowed to shift forward by gravity and thus make room for the next car, and so on. The locomotive crane tracks are so located that the bucket can always be brought over the track hopper without movement of the crane. The traveling speed of all cranes is slow, and movement along the tracks should be avoided whenever possible.

"Circular storage" is designed to minimize the travel of the crane and utilize the slewing, or swinging action of the boom, which can be handled rapidly. This enables the operator to maintain a large capacity. A crane of the dimensions given above has a capacity of 2000 tons in 10 hr., the average being 200 tons per hr. and the maximum 260 tons. Fig. 1 shows how the tracks are placed with reference to the track hopper. The coal is dug from the hopper by the clam-shell bucket and delivered to the storage pile, which when full takes the outline shown. When the pile is completely full, the circular track on which the crane runs is covered over.

### Increasing the Storage Capacity

By continuing the track system and adding more track hoppers, a succession of storage piles can be formed with a single crane, thus making an unlimited storage. When reloading, the coal is taken from the piles by the bucket and delivered direct to cars on the main receiving tracks.

The covering up of the circular tracks with coal gives the maximum storage for a given area and height of pile. This condition, however, is not considered the best for all localities and for all kinds of coal. The best and safest system is the one in which the crane tracks are left open. With such an arrangement the crane is always ready to handle the coal from any point in the storage, and move it to some other point, or to cars.

This is highly important in case the coal begins to heat, or if it is desirable to reload any particular part of the pile first. In the past few years engineers have been taking greater precautions than ever before, and in many cases, especially where the ground is valuable, they are paying a little more for the coal and procuring a better grade which is less likely to fire spontaneously. There is little or no trouble experienced from this cause in a storage plant where the coal is kept active. If, however, the coal is left in piles for a considerable time, greater care must be exercised; and in such a storage it is advisable to pile the coal so that it can be reached at any time by means of the crane

### Other Types of Storage

2. Coal is unloaded from boats by means of an unloading tower, a cable-car system and a crane. In this instance, there are two long-radius cranes, one a duplicate of the other, running on a U-shaped track. The cable cars run on a trestle and discharge the coal to the ground beneath, from which point the cranes pick it up and place it in storage. The storage space is sufficient for approximately 220,000 tons of coal, on a plot of ground about 600 ft. wide and 1200 ft. long.

All the coal in the above storage is tributary to the

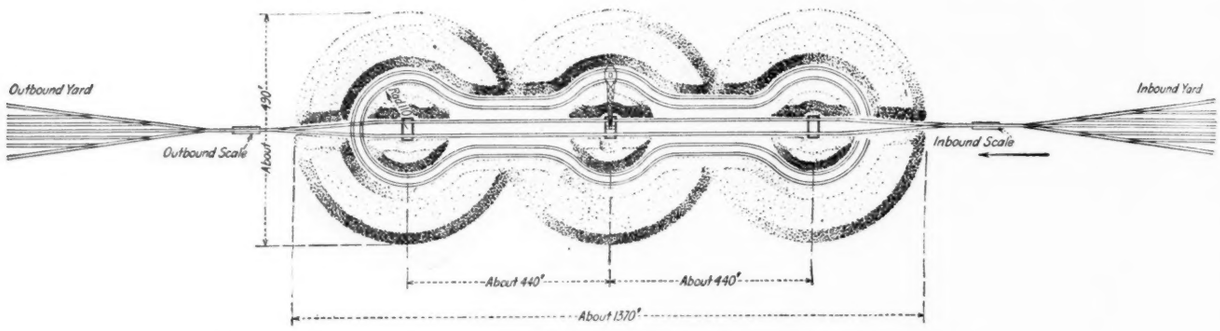



FIG. 2. STORAGE WITH THREE HOPPERS AND CRANE TRACK LOOPS

cranes, and for reclaiming, the coal is discharged to a traveling receiving hopper located on the cable-car trestle. From this hopper the coal is delivered to the cars, and is then taken back to a reloading conveyor running to boats. In this case the crane acts as a sort of distributor, but its action is the same as in case (1), except that the coal is taken from a track hopper in one instance and from the ground under the trestle in the other.

3. Coal is unloaded from boats by means of a long-radius crane, discharged into a receiving hopper, and thence into elevators leading to an overhead transfer bin. From this point the coal is either taken by a cable-car system and dumped under the trestle and distributed as in case (2), or taken direct from the transfer bin and loaded into railroad cars. Fig. 3 shows the general layout of this plan, from which it will be seen that the locomotive crane unloads the boats, as well as stores out and reclaims the coal. In this particular case a crushing plant is installed and coal can be stored either in a crushed or run-of-mine condition. The layout of the locomotive crane tracks is different in this case from those above described, and one crane operates on a dock.

The current size of the storage as described under heading (1) is from 100,000 to 150,000 tons per crane, with the tendency toward larger units. On the basis of handling into storage 150,000 tons per year the crane must handle a total of 300,000 tons. Usually coal can

be put into storage in a leisurely manner, but it must be reclaimed quickly. The system described above, however, is equally fast in storing out and reclaiming and with a crane of a capacity of 200 tons per hour it would require 150 days to handle and rehandle this quantity.

### The Cost of the Crane

The present cost of the crane itself erected on tracks is $33,500. The cost of each concrete track hopper, together with steel girders for carrying the railroad tracks, is $4500, and for a storage of the size mentioned above, with the coal approximately 20 ft. high, three of these would be required, or an expenditure for hoppers of $13,500. The crane operator receives $4 per day, the fireman $2.25 per day and the laborers, of whom three would be required—to spot cars, dump them, clean up the coal around the railroad tracks, etc.—receive $2 per day each.

Annual expenses of operation would be about as follows:

| | |
|---|---|
| Interest on $33,500 (cost of crane) at 6 per cent | $2,010.00 |
| Interest on 13,500 (cost of hoppers) at 6 per cent | 810.00 |
| Depreciation on crane at 8 per cent | 2,680.00 |
| Depreciation on hoppers at 5 per cent | 675.00 |
| Labor—Fireman, 150 days at $2.25 per day | 337.50 |
| Engineer, 150 days at $4 per day | 600.00 |
| Laborers, 150 days at $6 per day | 900.00 |
| Liability insurance (5 men, 6 months) about | 130.00 |
| Fuel for crane (3000 lb. per day at $2.50 per ton) | 562.50 |
| Oil, grease, waste, water, cleaning boiler tubes, etc., at $1.25 per day | 187.50 |
| Total | $8,892.50 |

From the foregoing it will be seen that the cost of handling one ton of coal per round trip is 5.928c. or 2.964c. per ton for taking the coal into storage and the same amount for reclaiming it. The above cost does not take into account the cost of the site, preparation of property or cost of track, and it is assumed that there are no delays due to shortage of coal, empty cars or labor. It takes into account merely the time required for handling the coal—namely, 150 days—and does not include any item for foreman or watchman, should they be desired.

The cost of handling as above expressed is somewhat higher than would be the case in normal times; almost every item, with the exception of insurance, fuel and supplies, has been materially increased. Below is listed for comparison what this plant would have cost a year and a half ago.

The cost of the crane was $25,800; the track hoppers $4000 each, or a total of $12,000; the crane operator received $3.50 per day; the fireman $2 per day; and the laborers, $1.50 per day.

Annual expense of operation would consequently be as follows:

| | |
|---|---|
| Interest on $25,800 (cost of crane) at 6 per cent | $1,548.00 |
| Interest on $12,000 (cost of hoppers) at 6 per cent | 720.00 |
| Depreciation on crane at 8 per cent | 2,064.00 |
| Depreciation on hoppers at 5 per cent | 600.00 |
| Labor—Fireman, 150 days at $2 per day | 300.00 |
| Engineer, 150 days at $3.50 per day | 525.00 |
| Laborers, 150 days at $4.50 per day | 675.00 |
| Liability insurance (5 men, 6 months) about | 130.00 |
| Fuel for crane (3000 lb. per day at $2.50 per ton) | 562.50 |
| Oil, grease, waste, water, cleaning boiler tubes, etc., at $1.25 per day | 187.50 |
| Total | $7,312.00 |

This shows that the cost of handling would be 4.874c. per ton, or an increase of 1.854c. per ton for present cost. This equals 21.6 per cent. over the rates which were current a year and a half ago.

## New Coal Seam in West Virginia Attracts Attention

A new bed of coal was discovered last year on Wolf-Pen Creek, about four miles from Richardson, W. Va., and about half a mile from the mouth of Wolf Pen and the same distance from the Peach Orchard branch of the Chesapeake & Ohio Ry.

The coal is about 7 ft. thick at the working face and appears to be practically clean, hard block coal. It is thought to be about 200 ft. above the Peach Orchard seam, although this is uncertain. The roof is said to be excellent. The new development is on the property of the Nats Creek Mining Co.

A pair of headings have been driven in 200 ft. and about 1000 tons of coal have been stocked awaiting the completion of 7000 ft. of track and a 400-ft. plane. As the old tipple at the mouth of Wolf Pen will be used temporarily, shipments will likely begin by Mar. 1. The tract to be operated contains about 1000 acres, with much more coal adjacent.

If the present thickness proves permanent, this seam will be one of the most valuable found in that region and will greatly encourage further prospecting. The identity of the seam is indeterminate at this time, but it will likely be cleared up next summer, if not earlier. The coal is said to be low in ash and sulphur and to be an excellent domestic fuel.

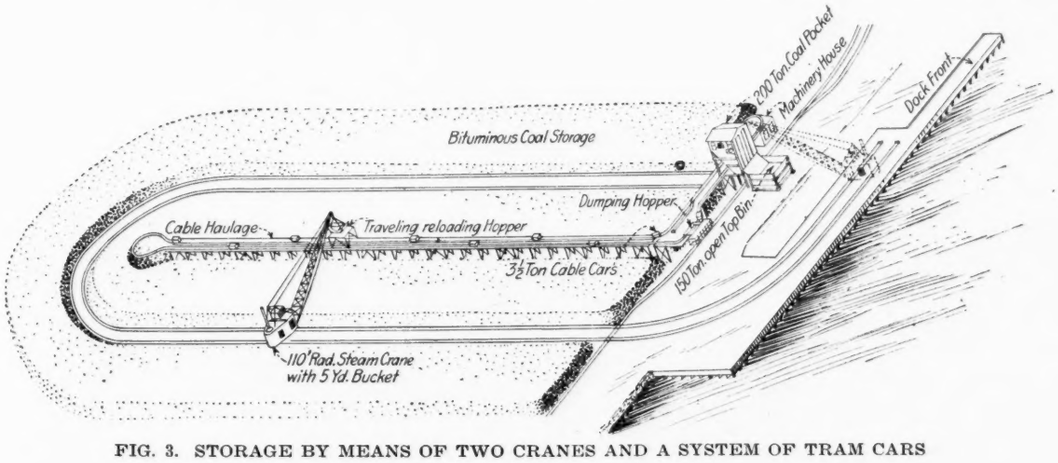



FIG. 3. STORAGE BY MEANS OF TWO CRANES AND A SYSTEM OF TRAM CARS

**Every Reader of "Coal Age"** is invited to contribute an article to the **Success Number,** which will appear Apr. 7. Pick out the most successful man, method or machine you are acquainted with and give us the story. Get the article to us by Mar. 20 at the latest.

# The Cement Gun in Oven Repairs

By H. V. Patterson*

*SYNOPSIS—Hand methods of repairing cracks in the linings of byproduct coke ovens are slow, tedious, hot, expensive and unsatisfactory. It is estimated that the cement gun will do patching in one tenth the time and secure ten times better results than can be secured by hand methods.*

The credit for the introduction of the cement gun into byproduct coke-oven work belongs to C. E. Underwood, now general superintendent of the Lehigh Coking Co., who first saw its possibilities and under whose supervision I made the first trials; to W. H. Wright, for negotiating for the tests and to the Cement Gun Co., for cooperating in every way in the development of the machine.

The first trial of the cement gun for byproduct coke-oven work was made at the plant of the Coal Products Manufacturing Co., of Joliet, Ill., under the direction of C. E. Underwood, who was at that time superintendent of the plant, and myself as assistant superintendent. An ordinary cement gun was furnished for the test by the manufacturers. This was sent to the plant and tried out for about six weeks.

From this test the present coke-oven gun was evolved. The first gun made especially for coke-oven work was then shipped to the Coal Products plant at Joliet and has now been in use for some time.

## Hand Repairs Were Difficult

For years before the cement gun came into use, the repairs to the interior walls of byproduct ovens were carried on under great difficulties. Owing to the expansion and contraction of the walls of the ovens, which are built up of comparatively small shapes, small cracks develop in the joints between the brick. Sometimes a brick itself will crack. These cracks allow of the leakage of gas from ovens to flues, or vice versa.

The neglect of such a leak may result in a high rate of combustion at a single point and the melting down of the brick. Therefore, the immediate repair of such cracks is imperative. As the oven chamber is long and narrow and a high temperature is maintained in it, it is not possible to send men inside to do the repairing while the ovens are under heat. To shut down for such repairs will cause greater contraction and hence increase the cracks. It can readily be seen, therefore, that to repair the oven under normal heat is an impossibility.

The old method was to place a small lump of clay on the end of a long iron bar and then try to force this clay into the crack. Even with expert labor many attempts were necessary before the crack was filled; and when it was filled the clay would probably fall out again in a few days, as it could only be pushed into the crack with little force. The process employed was analogous to working with a trowel with a handle of from 5 to 20 ft. in length. It may readily be seen that good work with a tool such as this was out of the question. Furthermore, considerable time was lost in the operation of the oven. With this method it was necessary to keep the doors off for long periods, and the cold air rushing into the hot interior caused further cracking. The harm that results to a coke oven when the door is kept off for any length of time is extreme.

With the use of the cement gun, however, all this has been changed. The gun is kept ready at all times, permanent air and water lines are laid along the inspection walks of the battery in front of the ovens, and convenient off-takes permit the use of short lengths of hose.

On the pusher side the gun is usually carried on the pusher platform. On the coke side, when there is sufficient room, it is carried on the door machine. Sometimes it is placed on the hot car, or a small truck is made to run on the hot-car track with the platform on a level with the coke-side inspection walk. As the gun is mounted on wheels of its own, it can be run out along the inspection walk to the oven on which it is to be used. On large batteries there should be a gun on both the pusher and coke sides, as this will do away with much moving about of the apparatus.

When a door is removed and the oven pushed the "patcher" at once inspects for leaks and cracks. The gun being ready, the "patcher" puts it into operation. A "lazy bar" across the front of the oven permits the use of a long pipe to which the nozzle is screwed, and with this the workman can reach to about the center of the oven, if this is necessary. With the aid of the "lazy bar" the nozzle is held steady and directed accurately at the crack to be repaired. By means of air at high velocity the clay is forced into the crack to considerable depth and makes a repair that is far more permanent than any that could be made by the old hand method.

## The Water Is Easily Controlled

An added advantage is the ease with which the amount of moisture in the mixed clay is varied, thus giving the "mix" the exact amount of water necessary for the proper setting of the clay or cement. The light weight of the pipe and nozzle is also an advantage over the old-fashioned iron bars, as these, if they were long, had to be large in cross-section in order to resist the pressure exerted when forcing the clay into the crack.

The time element is hard to estimate, for cracks are of varying size, but it is safe to say that the gun will work with ten times the speed of the old method and, in addition, will do the work ten times better.

The joint between the insulating and silica brick on all byproduct ovens is a great source of trouble. In practically all ovens this joint is made so that during expansion the silica brick will slide past the firebrick insulating wall. After expansion, and during the life of an oven, this joint must constantly be pointed up.

Leaks at this joint are particularly injurious, as the gas in burning will heat and warp the buckstays. To point these joints by hand is a long, tedious and extremely hot job. With a cement gun the operator can remain cool while at work and can do an entire jamb in less than 3 min. Furthermore, the gun forces the clay or cement to the very bottom of the joint.

*Superintendent, the Dover Byproducts Coke Co., Canal Dover, Ohio

The correct operation of a cement gun is not difficult to learn, and it is readily mastered by the ordinary oven laborer. Dry clay or cement in the hopper is essential. Dry air is also necessary, and it will be found of advantage to place a separator or baffle tank in the air line as close to the gun as possible. This takes out the entrained moisture and aids in the operation of the gun.

Briefly, the cement gun is a necessary adjunct to all coke-oven plants because of the speed, accuracy and excellent manner in which the work can be done, as well as its ability to reach points that are inaccessible to hand work on account of the heat.

## Explosion at Capitol Mine

By a Springfield (Ill.) Shotfirer

On Saturday, Jan. 20, 1917, an explosion occurred at the Capitol, or No. 7, mine of the Springfield District Coal Co., from the effects of which two shotfirers, George and Frank Young, brothers, lost their lives. According to the testimony at the inquest, the explosion was caused by a blownout shot.

The explosion happened about 7:30 p.m. The men were not taken out of the mine until about 10:30 p.m. One died on the way to the hospital and the other the next morning. Neither of them ever regained consciousness. Thus, as quite frequently happens in such disasters, those are dead who could probably tell the most about the causes of the accident. Shotfirers in the Springfield district have much to contend with, as the coal is all shot from the solid and the entries are nearly all only 10 and 12 ft. wide. The room necks also are made only 8 to 12 ft. wide. Thus there are many holes fired in narrow work and all these are apt to be so drilled as to constitute violations of the laws of this state.

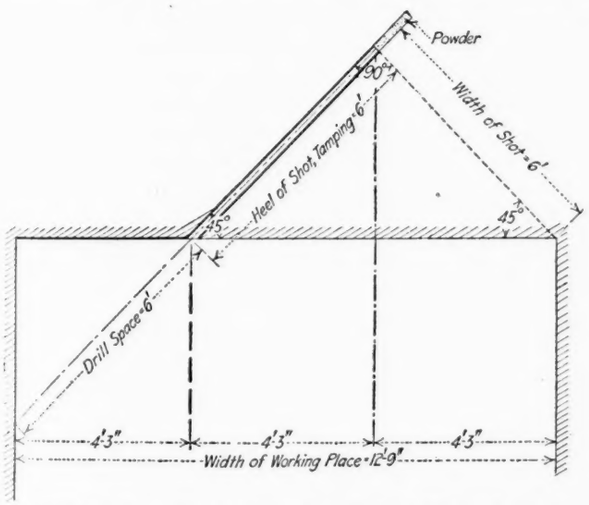



DIAGRAM SHOWING WIDTH NEEDED FOR LAWFUL SHOOTING

In some places only 8 to 12 ft. wide the miner will drill a 5-ft. "buster" in the center and 8-ft. holes on either side. I have seen holes 7, 8 and even more feet long drilled in an 8-ft. place with the face perfectly square. Of course, the shooting of such shots as these does not dislodge all the coal drilled. Most of the coal round the hole is still in place in the morning when the miner returns.

Shotfirers are "up against it" from every angle in this district, for the simple reason that there are so many who do not know the law and do not know when they are drilling a "dead hole"; and there are some who do not care. Many times I have heard the remark, "I hope the shotfirer don't turn that hole down, it will give me a chance for tomorrow." If the shotfirer fires the hole and nothing happens, all well, but if, on the other hand, he does not, from that time on he is a "crank" and "no good." Everybody in the mine has it "in for him" and life becomes so miserable and unbearable that he looks for a job in some other field.

The state law requires that the hole shall be so directed that the powder will have the same or less length of coal to fracture when it breaks it at right angles to the line of the shot than it would have if it broke the coal along the line of shot. The provision reads:

> No person shall drill or shoot a "deadhole" as hereinafter defined. A "deadhole" is a hole where the width of the shot at the point measured at right angles to the line of the hole is so great that the heel is not of sufficient strength to at least balance the resistance at that point. The heel means that point of the shot which lies outside of the powder. In solid shooting, the width of the shot at the point, in seams of coal 6 ft. or less in height, shall not be greater than the height of the coal; and in seams of coal more than 6 ft. in thickness the width of the shot at the point shall in no case be more than 6 ft. In undercut coal, no hole shall be drilled "on the solid" for any part of its length.

### Only Short Holes To Be Drilled in Headings

It is impossible to drive a narrow place with solid shooting unless the hole is quite short if the law is complied with. Nevertheless a violation of this provision is punishable by a fine not exceeding $500 or by imprisonment in county jail for a period not exceeding six months, or both, at the discretion of the court. If the miners were compelled to drill and shoot coal in this state according to law, not many of them would stay in the Springfield district, for they could not drive entry or turn rooms without drilling "deadholes" such as the law forbids. However, if a shotfirer says anything, they are ready to knock him down. Quite a number of shotfirers were killed in this district and the blame has in most of the cases been placed either on blownout or overcharged shots. But nothing has ever been done to eliminate the cause and the chances seem slim of getting it eliminated; nevertheless, something should be done to reduce this too numerous class of accidents.

The illustration shows the relation existing between width of place and length of heel for lawful shooting. The shot, however, is not any too safe as the requisite width of shot is only obtained by encroaching on the rib. Another 2 ft. of room width would be better.

If $x$ is the width of the room and $y$ the length of the shot heel

$$x = y \times 2.1213 \text{ and } y = x \times 0.4714.$$

Roughly the width of the working place must be twice the length of the heel of the shot. The drill space allowed is however none too large. The space allowed assumes also that the drill will be placed exactly at the angle chosen and at the right place in the face.

A 3-ft. heel would permit of driving a 6-ft. 4-in. place; a 4-ft. heel, an 8-ft. 6-in. place; a 5-ft. heel, a 10-ft. 7-in. place and a 6-ft. heel, a 12-ft. 9-in. place. Unless the drill hole is driven more nearly along the line of the face than at an angle of 45 deg. to it, the heel must not exceed 6 ft.; for the law limits the width of the shot to that figure.

# Scientific Methods of Coal Buying—I

By John B. C. Kershaw

*SYNOPSIS—This installment, the first of a series of articles on this subject, gives a rapid survey of the various methods used in different countries, with special reference to European practice.*

The isue of *Coal Age* for July 29, 1916, contained an article by Xeno W. Putnam on the subject of standards of coal valuation in the course of which he stated that no standard, easily understood and readily applicable, at present exists whereby the ordinary consumer may judge the actual value of one coal as compared with another, or with some other fuel. This statement is not quite correct as it stands, and an attempt will be made in this article to explain the principles of the more scientific methods of buying and selling coal that are now being practiced very widely in Europe and America.

### Fallacy of the Old Rule-of-Thumb Methods

There are few raw materials sold on a large scale, with such a complete neglect of common-sense rules and precautions, as solid fuel. It is not a material of fixed and definite composition, as many otherwise well-educated coal dealers and factory owners imagine, nor does the fuel obtained from one particular seam of the same mine show an invariable uniformity in ash content and thermal value. Coal is a substance of variable composition, containing most often a considerable proportion of incombustible matter, due partly to natural and partly to mechanical causes.

Seams of coal vary greatly in thickness, and always lie between layers of shale or clay. When the coal is obtained from the mine, either by blasting or cutting, portions of these adjacent layers necessarily come down with it, and the amount of this valueless material which is shipped as coal varies with the care exercised in the mining and picking and with the purpose for which the coal is to be used.

The belief that by stipulating that the coal shall come from a certain seam of a particular mine one is obtaining a guarantee of quality that will be valid as long as the seam lasts, is therefore a false one. The sooner this is eradicated from the mind of the coal dealer and the consumer, the more rapid will be the progress of the more scientific methods of buying and selling coal.

### The Three Important Constituents of Coal

From the scientific point of view the three constituents of coal that are of importance are: (1) The moisture, (2) the ash and (3) the combustible matter.

All these constituents can be accurately determined by the laboratory examination of small samples, if these have been taken by men trained for the work. The proper sampling of the fuel, however, is quite as important as the testing of the sample obtained; too often tests of fuel are worthless, owing to the lack of care or knowledge exercised in the sampling operation.

The moisture in coal varies from 3 per cent. up to 12 per cent., according to the conditions under which the coal is mined and the state of the weather when it is in transit from the colliery to the consumer. The moisture in coal, as delivered, is more than worthless to the user, since not only has he to pay freight and discharge dues for this water, but it absorbs heat in the furnace which cannot be recovered, and this heat passes off with the waste gases up the chimney. Moisture is thus a cause of absolute loss in more ways than one, and its percentage is an important factor in the valuation of a ton of coal.

The ash is made up of silica, calcium and iron, in combination with oxygen and sulphur and certain other impurities of the coal, which will not burn. It varies from 5 per cent. up to 20 per cent., being lowest in the washed slacks and in the best hand-picked house coals. Coals containing the lower percentage of ash are the more valuable, since not only do they yield a corresponding greater amount of heat, but there is less blocking of the air passages in the furnace by incombustible matter, and a more perfect combustion of the fuel is therefore attained. The labor of cleaning the fires and removing cinders, and the difficulties due to the formation of clinker are also reduced to a minimum when burning a coal low in ash. The fusibility of the ash is also important when the fuel is to be burned in furnaces and under conditions permitting the attainment of high temperatures. The percentage of ash and its physical properties can also be accurately determined by laboratory methods.

The combustible matter in coal is made up of the volatile hydrocarbon gases, which distill off on heating, and of fixed carbon, which burns away more slowly on the bars of the grate. The coals having a high percentage of fixed carbon and a low percentage of volatile matter are most easily burned so as to yield their maximum efficiency. A high percentage of volatile matter and a low percentage of fixed carbon, on the other hand, are apt to lead to the escape of half-consumed hydrocarbon gases and to the formation of smoke and soot, unless special devices are employed to provide an adequate amount of secondary air immediately after firing. The percentage of volatile gases and the proportion of fixed carbon in a sample of fuel can readily be ascertained by an approximate analysis.

The actual heating value of the combustible matter in fuel is, however, the most important determination, since this figure represents the maximum heat that can be obtained from the fuel under perfect conditions of combustion. The value may be calculated from the figures of the approximate analysis, but the direct determination is made by a test in one of the more accurate forms of fuel calorimeter. A large number of modifications of the original Berthelot bomb calorimeter have now been placed on the market and there is no difficulty in obtaining an instrument of this type which will yield reliable results in the hands of any chemist who has made a special study of this branch of analysis.

In the bomb form of calorimeter a weighed quantity of the fuel is burned completely to carbonic acid and water vapor, in an atmosphere of oxygen gas, and the heat generated by the combustion is absorbed by the surrounding water and can be measured accurately by the rise in temperature that occurs during the test. As the weight of water and the "water equivalent" of the metal parts of the whole apparatus are known, and form a

constant for each instrument, the rise in temperature gives a factor by aid of which the heating value of 1 lb. or of 1 ton of the fuel can be calculated. The results are expressed in British thermal units, 1 B.t.u. being the amount of heat required to raise the temperature of 1 lb. of water 1 deg. F.

Armed with the information obtained by the chemist with regard to the percentages of ash, moisture and thermal value of say half a dozen varieties of coal, the buyer is in a position to decide which is the most economical fuel for his purpose and also to insert clauses in his coal contract which will insure that the quality of his supplies shall be kept up to the level of the sample. Details of the various methods will now be given.

### Foreign Methods of Buying

In Hamburg there is an organization known as the "Verein für Feurungsbetrieb und Rauchbekampfung," and at the commencement of the war a large number of the members of this Verein were purchasing their fuel on scientific lines. Separate samples of each 50 tons of fuel delivered were taken at the consumer's works, and these samples were sent to the central fuel-testing laboratory for the determination of moisture, ash and calorific value. In many cases the purchasers of the fuel had arranged their contracts with the coal agents or dealers upon a sliding-scale basis, the price paid varying with the average calorimetric value of the monthly tests. In other words, it was heat units rather than coal that were bought and sold.

In the majority of instances at Hamburg, however, only two limits are inserted in the contracts—namely, a minimum calorific value and a maximum percentage for the ash. The seller of the fuel in these cases contracts to deliver a coal that shall not fall below a certain specified calorific value, or contain above a certain specified ash percentage. If any delivery of fuel occurs which does not comply with the conditions of sale, it is either returned or an allowance is made on the price. The average tests of the monthly deliveries are taken for deciding whether the coal is up to the standard of value, and slight deficiencies of 1 or 2 per cent. are overlooked.

The colliery companies and the coal dealers prefer this form of contract, and in many other cities and industrial centers of Germany the fuel required for large works is being purchased under what is practically a chemical guarantee of quality. In the year 1913, the last year for which figures are available, the central fuel-testing laboratory for the Verein tested 1000 samples of coal for its members in connection with contracts based on the above lines.

### Methods in Switzerland and England

The Government in Switzerland has founded and maintains a Federal fuel-testing laboratory at Zurich, as a branch of the famous polytechnic school at that place. In the first year of its existence 3300 samples of fuel were tested in this laboratory, and this number had increased to 5860 in 1912. The laboratory, which is under the charge of Dr. E. J. Constam, examines fuel samples for private firms and individuals as well as for the state railways, and as most of the fuel imported into Switzerland is in the form of briquettes, special attention is given to the determination of the ability of the fuel to stand handling and transport without crumbling.

Both the middlemen and the consumers are well satisfied with the results of the work of this laboratory, for it has served to enlighten them concerning the relative economic values of the briquetted fuels they have been importing from the various adjacent countries and has assisted in their classification according to heating power. The results of the tests are compiled monthly and are communicated to both the sellers and the buyers of the fuel. The settlement price in the case of briquetted fuels is arrived at by adding to or deducting from the contract price a proportionate sum for every 90 B.t.u., by which the average monthly calorific value of the deliveries exceeds or falls short of the standard value specified in the contract.

The application of scientific methods to the buying and selling of coal in England is less advanced than in Germany or Switzerland, partly because the Government has not adopted the principle in its purchases of fuel, but chiefly because the mine owners have set their faces against any alteration of the older rule-of-thumb methods of coal dealing. In spite of these obstacles, however, a large amount of fuel testing is being carried on in private and public laboratories in the United Kingdom, and all the larger and more scientifically managed works have their fuel deliveries regularly sampled and tested, either by their own chemists or by some independent analyst.

### Large Users Purchase with Care

The engineers of the large municipal electric supply undertakings have been the most active in this direction, and the following examples of their methods of controlling the quality of fuel supplies are instructive, since they show that in spite of the opposition of the colliery proprietors more scientific methods of control are being accepted in the case of customers whose contracts are large and worth keeping.

In a large municipal electrical supply undertaking in Scotland the chief engineer reports that samples are taken daily of all the coal, a small scoopful being taken by the checkweighman from each ton load delivered. These small samples are stored in a clean receptacle until the barge or wagon is empty. The sample is then reduced by crushing and quartering to 3 lb., and this is forwarded in a sealed tin to the testing laboratory of the electricity department. The contents of the tin are there crushed and still further reduced in bulk, the calorific value of the sample being finally determined in the bomb type of calorimeter.

If the tests show that the fuel being delivered is below the standard set for the particular pit from which it is shipped, complaint is immediately made, and the cause of the deterioration in quality is usually found to be careless mining and picking of the coal. By this means the engineer reports that they have obtained a thorough working knowledge of the relative values of all the fuels mined within a practical distance of the generating station, and when offers of coal are made they can bring all prices down to a common calorific basis by use of their past test records for each pit. Although the contract is not based on heat units, they are able to bring the contract price into close agreement with the real calorific value of the fuel.

At a large municipal electrical supply undertaking in the Midlands the chief engineer and general manager re-

ports that the fuel is sampled and tested daily. Samples are taken from the rotary filler supplying a conveyor at intervals during the unloading of each boat, the coal in this case being delivered by canal. Each day's samples are mixed and quartered down into two lots of convenient size. One of these is tested for calorific value, ash and moisture daily, and the other portion is put with the previous day's sample in order to make up the weekly average sample of fuel.

The contract stipulates a certain calorific value and ash percentage, but the price is not dependent upon the quality. This latter must, however, be maintained or the fuel can be rejected; if not rejected, a claim can be made for a reduction in price based on the average figures of tests taken over the period in question.

### Practical Tests Supplement Laboratory Examinations

The borough electrical engineer of a large municipal electrical supply works in the north of England reports that tenders are invited for fuel to a specification which records the minimum calorific value of the fuel and also the maximum percentage of ash. When the tenders are received certain fuels are picked out for testing purposes. A sample lot of 100 tons is asked for (this is equal to one day's supply) and the whole of the works is then run on this sample lot, the weight and cost of fuel per unit generated and the percentage of ash made being carefully noted. In addition to this practical test a laboratory test is made from a sample sent to an analytical chemist.

The contract is placed with the firm whose sample of fuel shows the best practical results per unit generated, but regular analytical tests of the fuel are made during the period for which the contract runs, and a clause is inserted in it giving power of canceling the contract in the event of the fuel not coming up to the guaranteed calorific value. The laboratory tests are therefore used in this case solely to check the quality of the fuel delivered.

The majority of contracts entered into by large users of fuel in the United Kingdom who have fuel testing laboratories (or who retain the services of some independent chemist) are based similarly on a certain definite standard of quality expressed in B.t.u.'s and upon limiting percentages for moisture and ash. Should the coal delivered not come up to this standard it may be rejected. This course is seldom adopted, however, and more usually some modification in price or a refusal to renew the contract occurs. The knowledge that regular and systematic sampling and testing of the fuel is being carried out at the user's works has a marked effect upon the care exercised at the pit head in the picking and screening of the fuel.

### Methods in America

With regard to the progress of scientific methods of coal dealing in the United States, the following list of bulletins and technical papers issued by the Bureau of Mines at Washington indicates that the subject has received great attention and that there is plenty of information available for those who desire it. As a general rule the large fuel users who have adopted these methods are purchasing their fuel on a sliding-scale basis, which permits the price to vary with the calorific value of the fuel delivered, deductions being also made for excessive percentages of moisture and ash.

The fact that several departments of the Government have adopted the principle in their purchases of fuel has of course had an effect upon the coal owners and has rendered it more easy for private firms and individuals to introduce similar purchase clauses into their fuel-supply contracts.

Bulletin 339 (1908)—The Purchase of Coal Under Government and Commercial Specifications on the Basis of Its Heating Value

Bulletin 362 (1909)—Mine Sampling and Chemical Analysis of Coals Tested at the United States Fuel-Testing Plant, Norfolk, Va

Bulletin 378 (1909)—Results of Purchasing Coal Under Government Specifications, 1907-1908

Bulletin 428 (1910)—Results of Purchasing Coal Under Government Specifications, 1908-1909

Bulletin 27 (1910)—Tests of Coal and Briquettes as Fuel for House-Heating Boilers By D T Randall; 44 pp ; 3 plates; 2 figures

Bulletn 28 (1910)—Experimental Work Conducted in the Chemical Laboratory of the United States Fuel-Testing Plant at St Louis, Mo , Jan 1, 1905, to July 31, 1906 By N W Lord; 51 pp

Bulletin 41 (1910)—Government Coal Purchases Under Specifications with Analysis for the Fiscal Year 1909-1910. By G. S. Pope; with a chapter on the Fuel-Inspection Laboratory of the Bureau of Mines. By J. D. Davis, 1912; 97 pp.; 3 plates.

Technical Paper 1—The Sampling of Coal in the Mine. By J. A. Holmes, 1911; 18 pp.; 1 figure.

Technical Paper 8—Methods of Analyzing Coal and Coke. By F. M. Stanton and A.C. Fieldner, 1912; 21 pp.; 5 figures.

Technical Paper 26—Methods of Determining the Sulphur Contents of Fuels, Especially Petroleum Products. By I. C. Allen and I. W. Robertson, 1912; 13 pp.; 1 figure.

Bulletin 22 (1913)—Analyses of Coals in the United States with Description of Mine and Field Samples Collected Between July 1, 1904, and June 30, 1910. By N. W. Lord and Others. Parts 1 and 2.

Technical Paper 76—Notes on the Sampling and Analysis of Coal. By C. Fieldner, 1914; 59 pp.; 6 figures.

## A Successful West Virginia Operation

The Columbus Iron and Steel Co., of Columbus, Ohio, has an interesting mine and town at Marting, Fayette County, W. Va.

The mining village consists of 124 houses, one two-room schoolhouse for whites, and a school for colored children. There is also a Methodist Episcopal Church, a Sunday school for whites and a Baptist church for the colored folks. There are two passenger trains daily, ingoing and outgoing.

The village is situated within four miles of Montgomery, W. Va., one of West Virginia's most progressive towns. It is divided into four districts, and a prize is given in each district for the best kept garden or lawn. The fences are whitewashed and kept in repair, as are the houses. A well at the powerhouse is 250 ft. deep and supplies cold drinking water the year round. This is mineral water, having the same analysis as the famous White Sulphur Springs of Greenbrier County, W. Va. An uptodate commissary is maintained which has a full line of all commodities in stock at reasonable prices.

### Mine Capacity To Be Increased

The mine is a drift opening in the No. 2 gas seam. The company's land is also underlain with the No. 1 gas, or Eagle seam, 4½ ft. thick, which has been thoroughly drilled by a core drill. A shaft 140 ft. deep will be sunk in the near future, making this mine one of the largest producers in the Kanawha field.

The roof overlying the No. 2 gas seam is good, and the bed seems to be free of gas. The tipple is a steel structure throughout, equipped with shaker screens, designed and installed by the Jeffrey Manufacturing Co., of Columbus, Ohio. Eighty-four beehive ovens at the plant take care of all slack made over 1-in. screens. Coke is extracted and loaded into cars by a Covington extractor and loader.

The power plant is equipped with a large type 500-hp. Skinner engine driving an Allis-Chalmers generator, 200-kw. direct-connected, one 100-kw. Morgan-

INTERIOR OF COMPANY STORE

POWER HOUSE, BATHHOUSE AND STABLE

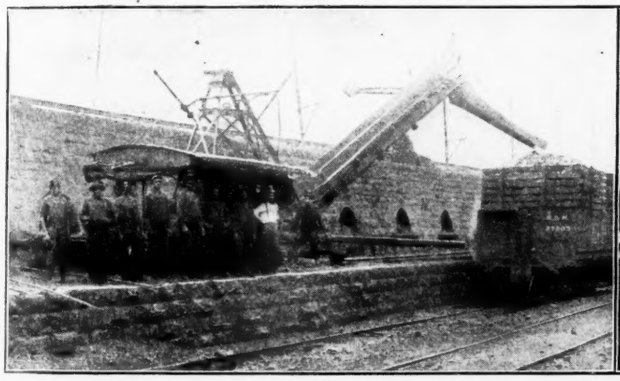
Gardner generator, belt-driven, and one Westinghouse generator set, 150-kw., driven by power furnished by the Virginia Power Co. The latter machine is only used when one of the steam-driven engines is down for an overhauling. Four Erie return tubular boilers, 150 hp. each, drive all the machinery, including one 18-ft. Crawford-McCrimmon steam fan, one Jeffrey crusher and an elevator.

A well-equipped machine shop, also a car repair shop and blacksmith shop maintained in connection with the machine shop, is electrically driven. Three Jeffrey gathering locomotives and four mule teams gather 800 to 1,000 tons of coal per day of nine hours, which is hauled to the tipple by two 13-ton Jeffrey electric trolley locomotives.

A bathhouse equipped with shower baths, one for whites and one for colored miners; also facilities for changing clothes is maintained.

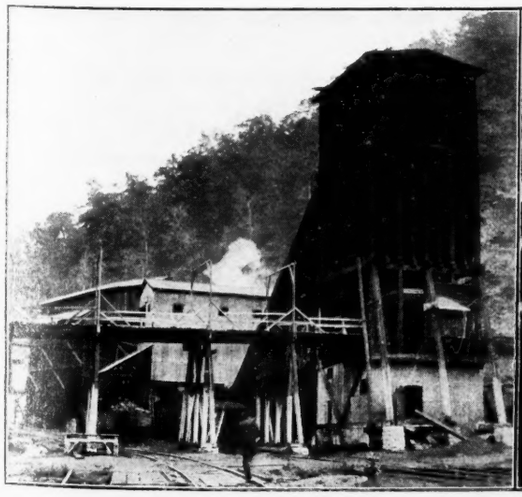
Good wages are made by the loaders, machine-runners and pick miners. Marting is favorably known for its steady operation, as considerable of the output is consumed by the company at its Columbus plant.

The officers of the company are as follows: President, Col. J. G. Battelle; vice-president and general manager, J. H. Frantz; secretary and treasurer, J. C. Miller. H. A Jepson is superintendent in charge at Marting, W. Va.

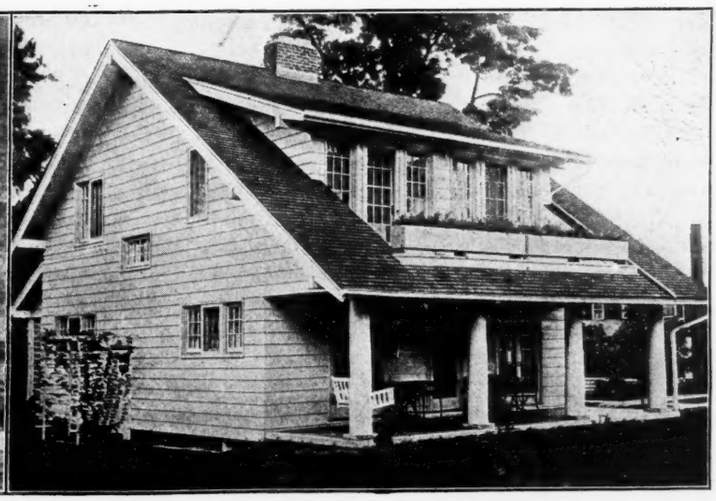


COKE MACHINE AND YARD HANDS

LOADED TRIP AT TIPPLE



SLACK BINS AND TIPPLE



THE MINE SUPERINTENDENT'S HOUSE

# Pennsylvania Commission Reports on the Increased Cost of Coal

*SYNOPSIS—An exhaustive analysis of the increased cost of coal. Railroad rates found to be discriminatory. Loss on steam sizes a contributing factor. Many complications were occasioned by the Pennsylvania State Tax laws. Advance in wage scales, higher cost of materials and heavier taxes have increased the cost of production. Recommendation is made that canal transportation be investigated. Selling costs have increased rapidly. Retail price of coal has advanced $1 per ton, or about 15 per cent., since 1913.*

The Pennsylvania Anthracite Coal Commission, which was created by an act of the legislature of 1913 to inquire into the causes of the increased cost of anthracite coal, has now presented the report of its investigation. The commission was to learn the reason for the increase, whether this was accomplished by an illegal combination on the part of either the operators or dealers, and to ascertain if the raise in price was justified by circumstances.

The report opens with a résumé of the history and development of the anthracite coal fields and then gives several tables comparing the prices of the domestic sizes of coal for the past four years. An interesting comparison is also shown wherein on shipments of anthracite to New York harbor the producing company retains 42.50 per cent. of the consumer's cost of a gross ton of coal, averaging the domestic sizes. Of this price the railroad company receives 22.35 per cent., and the retailer secures as his portion 35.15 per cent. In Philadelphia, based on the relative calculation, the producer's share is 51.89 per cent.; railroad, 26.30 per cent.; retailer 21.81 per cent.

The prices used in this computation were those of April, 1914, because at that time the producer received the lowest price for his coal on account of the 50c. discount allowed on domestic sizes during that month. The percentage retained by the carrier in the first instance appears small because of the higher prices charged by New York retailers. In that city the retailer buys in long tons but sells to the consumer in short tons.

The commission also finds that on account of a freight discrimination against Philadelphia the railroads get less for the New York haul. A table is shown giving the retail price of a ton of coal at Philadelphia as compared with a number of distant cities, such as Schenectady, N. Y., Worcester, Mass., Montreal, Can., and Ottawa, Can., and it is determined that whereas the railroad company receives 52 per cent. of the cost of a net ton of coal in Philadelphia, this percentage is only exceeded by one of the more distant points, that of Suspension Bridge, Can., which is 52.4 per cent.

### Profits of the Mining Companies

As to the cost of producing coal, the preliminary conclusion is drawn that, all other things being equal, the annual tonnage produced and the percentage of prepared sizes secured in such production contribute in a great extent to the success or failure of mining. The distinction of prepared sizes is made as against the steam sizes which are actually sold at less than cost of production. With this in mind tables are produced for the larger mining companies showing the annual tonnage, the proportion of prepared sizes, the average cost of production per ton, the average price received per ton and the gross margin of profit.

The gross margin of profit multiplied by the tonnage sold represents the amount available for the payment of interest on bonded debt and for dividend payments. The average gross margin of the Philadelphia & Reading Coal and Iron Co. for the last four years was 16.32c.; Lehigh Valley for three years beginning with 1913, 20.69c.; Lehigh Coal and Navigation Co. for three years from 1913 and first nine months of 1916, 17.82c.; for the same period the Susquehanna Coal Co. showed an average loss of 12.22c.; Lehigh & Wilkes-Barre Coal Co. a gross profit of 67c.

### The Losses on Steam Sizes

The commission states that these figures were accepted from the various companies and have not been verified. It is pointed out, however, that the average margin of profit per ton is substantially reduced by the sale of the steam sizes at a loss and the suggestion is made that the companies themselves are responsible for the small margin of profit on account of having contracted to sell steam sizes not only at less than production cost, but even lower than the current market price to favored customers.

As a specific instance it is pointed out that the Lehigh Coal and Navigation Co. and the Lehigh & Wilkes-Barre Coal Co. entered into a twenty-year contract on May 7, 1898, with the Lehigh Zinc and Iron Co. and the New Jersey Zinc Co. to furnish fuel coal from the Lehigh region at 55c. per ton and from the Wyoming region at 75c. Reference is also made in this connection to a report of the Interstate Commerce Commission showing that whereas the freight rate on this coal from the Wyoming region is 75c. and from the Lehigh region 60c., the railroad company has actually transported the coal at a rate of 29½c. a ton.

As opposed to this reasoning of securing a better price for steam coal it is pointed out that during the period from 1890 down to 1913 there has been a very perceptible increase as a whole in the percentage of steam sizes, owing to the recovery of usable fuel from the culm banks and the saving of small sizes at the breakers.

On the matter of the somewhat disproportionate profits of some mining companies as compared with others, this is ascribed to the more favorable location of some producers. Because of this fact the commission believes that these operators must naturally receive the benefit of a prevailing price, for were they to so reduce their price as to make their margin of profit equal to that of the operators less favorably situated, the only possible solution would be the complete elimination of the smaller and less favorably located and, in most instances, the independent operators.

The report devotes considerable space to the Roney Tax Act of June 27, 1913, which was in effect until June 1, 1915, and the Dawson Act of June 1, 1915, which is still in effect. The Roney Act was declared unconstitutional in an opinion handed down by the Supreme Court of the state in October, 1915. By the provisions of the Roney Act the tax amounted in round figures to 10c. a ton on the prepared sizes and to 5c. a ton on steam sizes; this was added to the price of the coal by the operator, being based on the cost at the mines.

By some operators the tax was added to the price of the coal as a separate item. In a few instances no tax was added, and in some cases it was added without being separately itemized. These practices continued in a general way until Jan. 1, 1916, when the tax in every instance ceased to be added as a separate item, but was included in the circular price. The operators justified this addition to the price on account of the cost of the Compensation Law which went into operation at that time.

At the time the Roney Act was declared unconstitutional the money collected under the act was in the hands of the operators, and the commission learned that the amount so held by the leading anthracite companies amounted to about $3,273,140, of which up to this time $2,932,102 has been returned. It is understood that the balance will also be refunded.

While the commission does not seek credit for having accomplished the return of this money, it does feel that the prompt investigation of the matter resulted in expediting such return and in stimulating some operators who until that time had shown no inclination of so doing. It has been estimated that $5,000,000 has already been returned by all the producing companies since the voiding of the Roney Act.

### Retailers Retained the Money Refunded

Particular pains were taken to ascertain what disposition the retailers had made of the money so refunded. In every instance, except where there had been a special contract for its return, the commission found that the retailers retained the amounts refunded to them. The general explanation offered by them was that they had made no increase in their circulars as the direct result of the increased price at the mine on account of the tax. They sought to explain the increase of 25c. a ton generally made in December, 1913, as being due to a general increase in the cost of labor and supplies. The commission, therefore, believes that there was occasion for the retailers to increase the price of anthracite coal in December, 1913, but is also of the opinion that the refunds made by the operators were in a large measure unexpected and that the refund swelled their profits to just that extent.

There is no tangible evidence, according to this report, that indicates any unlawful combination on the part of either operators or retailers to raise the price of anthracite coal by taking advantage of the state tax.

In its endeavor to ascertain the causes for the increased cost of coal the commission examined into the miners' wage agreements of 1903, 1909, 1912 and 1916, all of which they found had contributed to the increase. The new agreement of 1916 in particular added 25 to 30c. per ton to the cost of producing coal. Likewise the increased cost of materials and supplies similarly contributed to the increase.

In addition it was found that the Workmen's Compensation Act of 1915 had helped to produce the same effect. In order to meet this latter contingency it was found that some companies were charging off 5c. a ton, while others are carrying their risk with insurance companies and hope ultimately to receive a dividend from them which may reduce the cost. As it now stands, with but six months' experience under the act, it is difficult to ascertain the exact cost; but it is felt that it will not be less than 5c. a ton.

Another feature contributing to the increase was the greatly augmented taxes levied against the coal lands in the various counties. The officials of the Lehigh Valley Coal Co. testified that the assessment of their coal lands in Luzerne County had increased from $3000 an acre to $12,000, with an increasing rate of taxation from 1910 to 1916. The president of the Lehigh and Wilkes-Barre Coal Co. stated that their taxation amounted to about 21c. per ton of output during the four-year period 1910-1916. The commission is of the opinion that these three factors—labor, cost of supplies and taxation—must necessarily reflect themselves in the price of coal to the disadvantage of the consumer, and that the operators certainly cannot be charged with blame in this respect.

In addition the rapidly growing difficulty in the mining of coal, owing to the deepening of shafts and lengthening of gangways and the increased pumpage necessary to rid the mines of water, together with the cost of mining thin veins, enhances the cost of production.

The situation with respect to the class of labor employed has also tended to reduce the output. The people now chiefly engaged in mining are from Greece, Armenia, Italy, Ireland, Russia, Poland and Hungary. These nationalities have about 21 different holidays, which added to the nine legal holidays of the state combine to make more than one month of every year that is lost in holidays alone to certain numbers of the workers.

As to the profits of the operators and whether the increases made in the price of anthracite coal have been justified or not, the commission is of the opinion that the percentage of increase has not been out of proportion to the increased cost of production.

### Unequable Freight Rates and Canal Transportation

The report quotes in considerable detail the suit now in the courts in which the railroads have been ordered by the Public Service Commission to reduce the rates to Philadelphia. It is stated that the rates to the city via the Philadelphia & Reading Ry. and the Pennsylvania R.R. from the Schuylkill district are: Prepared sizes, $1.70; pea, $1.40; smaller, $1.25. The former road, in conjunction with the Lehigh Valley and Central Railroad of New Jersey, charges $1.86 for prepared sizes; $1.56 for pea; $1.41 for smaller, while on the other hand the Pennsylvania R.R. rates from the Lehigh region in conjunction with the Lehigh Valley and Central Railroad of New Jersey are only 5c. higher than the rates from the Schuylkill region.

In taking up the question of transportation of coal via the canals, the commission goes into the history of the two water routes from the mining region—namely, the Schuylkill canal and the Lehigh canal. It is shown that since the ownership of the Schuylkill canal has been ac-

quired by the Reading company through lease the tonnage has fallen from over a million tons in 1869 to about 72,600 in 1911. As to the Lehigh canal, which leased all its property, including railroads, to the Central Railroad of New Jersey, in 1871, it is shown that the canal property was returned to the company in 1878, that the traffic has declined since that date and that in the year 1915 it was operated at a deficit.

The commission deems the possibilities of canal transportation so important that it recommends that the matter be referred to a subsequent commission for careful and diligent study and thorough examination. In the testimony offered before this commission the claim was made that the transportation of coal could be reduced one-half.

### Selling Methods and Costs

As to the matter of selling expenses the commission felt that the organization of such agencies as the Lehigh Valley Coal Sales Co. only added to the cost of marketing coal. It was learned that the operators disposed of their products in three ways: First, the instances where the operators themselves sell their output through a sales department of their own; second, where the output is sold through a selling agency at a fixed price per ton; third, where the operators sell their entire output either to a selling agency or larger operator who maintains a sales department, at a fixed percentage of the current market price. It was found that the selling expenses though a middleman amounted to about 7½c. per ton.

In determining the retailers' profits the commission found the situation less complicated, as the only two items necessary to fix were the cost of the coal and the retail selling price to the consumer. Testimony in this respect was taken from dealers in various parts of the state and their replies indicated a somewhat varying margin of profit, even among those doing business in the same place. In Philadedphia the George B. Newton Coal Co., a combination of 36 different yards, presented a table showing that its average net profit on a ton of coal for the 33 months since the organization of the company was a little over 17c. Another large retailer, E. J. Cummings, presented figures showing that his average net profit during the years 1914, 1915 and 1916 was but 13.4c. per ton.

### What the Increase Amounts To

After compiling a table of the average wholesale and retail prices for the last three years by months, it is shown that the retail price of coal has been increased $1 per ton during that period, while wholesale prices increased from 40 to 50c. per ton. The retailer has an increased profit of at least 50c., and in many instances 60c., more than in January, 1913.

To offset this is the increased cost of distribution, which for the one item of labor alone, as shown by the George B. Newton Coal Co., amounted to $80,000 a year. In addition gasoline, horse feed, horses, shovels, bags, buckets, taxes and wages have increased during the recent past with startling rapidity.

The commission learned that in New York City the gross profit on a ton of coal was $3.30; in Boston, $3.10; in Baltimore, $1.65, and thinks that this greater margin is due to the practice of selling net tons and a discrimination in freight rates against Philadelphia and Pennsylvania generally. It also believes that the fact that there are over 300 retail yards in Philadelphia as compared with 61 in New York City is a contributing factor in the cost of delivery.

The commission stated that there was in its opinion, nothing to indicate on the part of the Philadelphia & Reading Coal and Iron Co. any effort to curtail the output, either by refusing extensions of leases or the offering of impossible terms. It feels duty bound, after painstaking effort to uncover such facts, to commend the cordial relations existing between that company and the independent operators.

The commission recommends legislative investigation of the subsidence of property in the Hyde Park district of Scranton; that efforts be made to bring to a speedy conclusion the freight reduction case; that an investigation be made of canal transportation, and that the subject of this report, if found to need further investigation, be broadened in scope so as to include the bituminous situation.

In concluding its report the commission states that so far as an advance in the retail price of coal was concerned the net result of its work shows that since 1913 coal has advanced $1 a ton, or approximately 15 per cent. As to the profits of the retailers, the commission does not find these to be the result of any illegal combination.

## Underground Haulage Costs

In view of the recent discussion upon various methods of underground haulage and the merits and demerits of the electric motor, storage battery and gasoline unit, the following figures, which were extracted some years ago from a German technical publication, the name of which has been forgotten, may be of interest. They form about the most complete comparative statement upon this subject that has been published in many years. The tables given herewith have been constructed from the data given in the figures and statements quoted.

### ELECTRIC LOCOMOTIVE

Conditions — Tonnage, 2,530 per day of 16 hr.; distance 3¼ mi.; speed, 7½ mi. per hr. Material said to be ore.

Cost of Plant — Four locomotives, including transformer apparatus and trolley wire, $54,748.

Working Expenses — $25,911, distributed as follows:

| | | Approximate Per Cent. of Total |
|---|---|---|
| Interest and depreciation 10 per cent | $5,474 | 21 |
| Upkeep of locomotives | 2,623 | 10 |
| Upkeep of trolley wires, etc | 1,810 | 7 |
| Wages | 5,975 | 23 |
| Power | 8,399 | 33 |
| Oil and Waste | 1,630 | 6 |

The operation cost worked out at ¾c. per ton-mile.

### STORAGE BATTERY

Conditions — Tonnage, 2,400 per day of 16 hr.; distance, 1,200 yd.; speed, 6½ mi. per hr.

Cost of Plant — Cost of five locomotives (20-hp.), weighing 6½ tons, also of transformers, switchboard and reserve $14,600
Accumulators 10,219
Cable, rooms for transformers and charging 7,542

Total $32,361

Working Expenses—Annual amount, $14,133.

| | | Approximate Per Cent. of Total |
|---|---|---|
| Depreciation | $1,460 | 10 |
| Parts for batteries | 1,469 | 10⅓ |
| Interest on total first cost | 1,095 | 8 |
| Wages of drivers | 3,581 | 25½ |
| Brakemen's wages | 992 | 7 |
| Attendance on transformers and batteries | 2,671 | 19 |
| Upkeep and cleaning | 569 | 4 |
| Oil and waste | 141 | 1 |
| Power, 186,349 kw.-hr. | 1,790 | 12⅔ |
| Acid, distilled water, etc | 355 | 2½ |

The operation costs were 3c. per ton-mile, but it is considered that the conditions were not favorable.

### BENZOL (GASOLINE) LOCOMOTIVE PLANT

Conditions — Tonnage, 1,250 per day of 16 hr.; distance, 1,000 yd., sloping toward shaft at 4 per cent. grade; speed of 3¾ to 5½ mi. per hr.
Cost of Plant, $8,930.

| | |
|---|---|
| Four locomotives, 8-hp | $6,813 |
| Filling apparatus | 73 |
| Engine shed for six machines | 2,044 |

Working expenses—for six months, $587.

| | | Approximate Per Cent. of Total |
|---|---|---|
| Interest and depreciation | $87 | 15 |
| Upkeep of locomotives | 180 | 31 |
| Wages of engine drivers | 136 | 23 |
| Wages of brakemen, etc. | 68 | 11 |
| Benzol | 97 | 17 |
| Oil and waste | 19 | 3 |

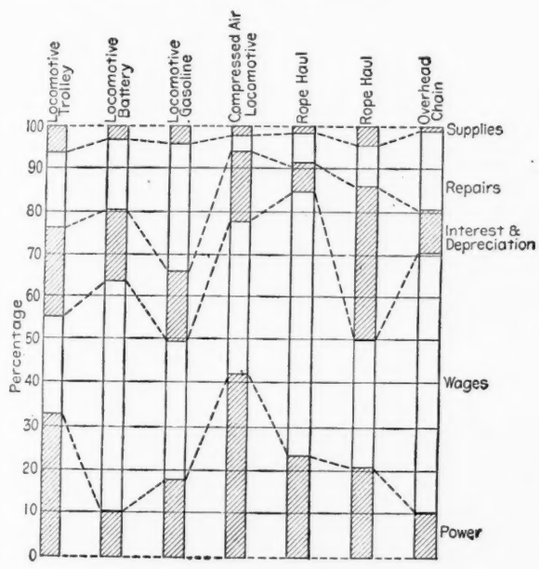
This operation works out at 3c. per ton-mile.

### COMPRESSED-AIR HAULAGE

Conditions—Tonnage, 1,242 tons in 16 hr.; distance 1½ mi.
Cost of Plant—Four 12-hp. locomotives weighing 5½ tons, hauling 40 to 50 cars of 17 cwt. gross, compressor, plant and accessories, $14,500.
Working Expenses—Annual amount, $9,391.

| | | Approximate Per Cent. of Total |
|---|---|---|
| Interest and depreciation at 10 per cent | $1,460 | 16 |
| Repairs, upkeep, oil and waste | 608 | 6 |
| Wages, brakemen and switchmen | 851 | 9 |
| Wages of drivers (5) | 1,971 | 21 |
| Cost of attendance on plant | 365 | 4 |
| Consumption of power (170 hp., 16 hr. per day, 300 days) | 4,136 | 44 |

This works out at 2¼c. per ton-mile.




GRAPHIC COST CHART

### ROPE HAULAGE

Conditions—Tonnage, 1,690 in 18 hr.; distance, 1,400 yd., main road served by a number of branches. Gradient of 5 per cent. for 700 yd., including right-angled turn.
Cost of Plant—$5,092.

| | |
|---|---|
| Total cost of installing | $2,929 |
| Rope | 973 |
| Share of outlay on haulage engine and buildings | 2,190 |

Working Expenses—Annual amount, $7,526.

| | | Approximate Per Cent. of Total |
|---|---|---|
| Depreciation and interest | $496 | 6½ |
| Wear and tear on rope | 486 | 6½ |
| Wages of hookers-on | 3,504 | 46 |
| Two engine drivers | 734 | 10 |
| Roadman | 365 | 5 |
| Upkeep, repairs, oil, cleaning, waste | 116 | 2 |
| Cost of power | 1,825 | 24 |

This cost works out at 1¼c. per ton mile.

### SECOND ROPE HAULAGE

Conditions—Tonnage, 2,100 in 10 hr.; distance, 3 mi. on a level track.
Cost of Plant—Including engine, 250 hp., and accessories, $48,666.
Working Expenses—Annual amount, $15,069.

| | | Approximate Per Cent. of Total |
|---|---|---|
| Interest and depreciation at 10 per cent | $4,866 | 32 |
| Wear and tear of rope | 851 | 5½ |
| Upkeep, repairs, cleaning, oil waste | 618 | 4 |
| New parts for rope haulage and rope clips | 837 | 5½ |
| Wages of hookers-on | 4,088 | 27 |
| Engine driver | 296 | 2 |
| Cost of power | 3,513 | 23 |

This works out to ¾c. per ton-mile.

### OVERHEAD CHAIN

Conditions—Tonnage, 1,750 per day of 16 hr.; level track 1¼ mi. long.
Cost of Plant—Machinery, including 65-hp. engine, $6,082; chain, $2,929, total, $9,011.
Working Expenses—Annual amount, $13,828.

| | | Approximate Per Cent. of Total |
|---|---|---|
| Interest and depreciation | $876 | 6 |
| Interest and depreciation of chain | 525 | 4 |
| Wages of hookers-on | 7,878 | 57 |
| Repairs and upkeep of plant | 111 | 1 |
| Oil and waste | 141 | 1 |
| Cost of power | 1,786 | 13 |
| Upkeep of haulage road | 2,501 | 18 |

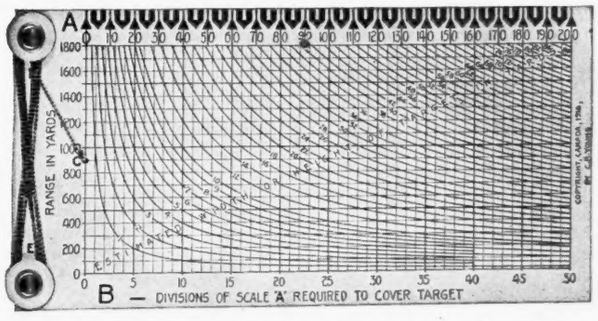
This is almost exactly 2c. per ton-mile.

## Range Finder and Clinometer

Maj. C. R. Young, of the Canadian School of Infantry, Toronto, Ont., has devised a simple instrument for roughly determining distances which is of use to mining engineers. It is based on the fact that it is easier to judge the size of familiar objects on the landscape than to judge their distance from the eye. With a little practice, it is claimed, an observer can make very close estimates of such dimensions as heights of buildings to the eaves, heights of common trees, telephone and telegraph poles, etc., while the heights of many things such as doors, cars, fences, horses and men are matters of common knowledge; and from these the ranges or distances are easily determined.

The accompanying illustration shows the instrument, which consists of a heavy, opaque piece of white celluloid 3x6 in. A small cord is attached to the card at *C*, on the left-hand border of the diagram. The length of the cord is five times the length of the scale *A*, at the top of the card (about 25 in.). The rest of the card is nothing more nor less than a stadia diagram.

The end of the cord is held close to the eye, and the card is held at the other end of it in a perpendicular plane. The width or height of the target or object sighted at is read on scale *A*. Reading up from the same division on scale *B*, at the lower edge, to the curve of the




RANGE-FINDING DIAGRAM, WHICH CAN BE USED IN TAKING TOPOGRAPHY

corresponding reading, gives on the scale the distance or range to the nearest 100 yd., or feet, as the case may be.

The device may, of course, be used to estimate the dimensions of a target or object at a known distance, and by putting the cord through the center hole in the top scale and attaching a weight or plumb bob, it can be used as a clinometer. For this purpose the reverse side of the card carries a scale of angular divisions. The reverse side also has directions for using the instrument and a table of dimensions of common objects.

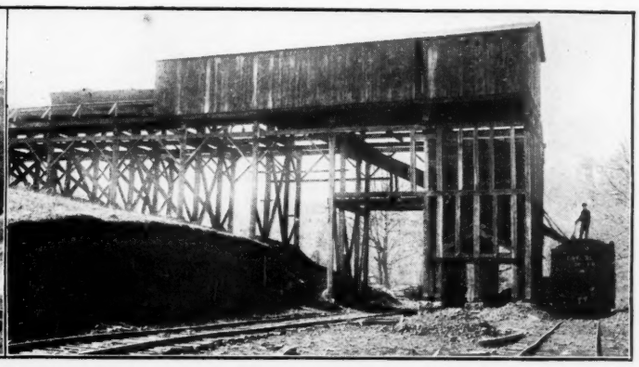
The device is copyrighted in Canada and may be obtained by engineers in the United States from Maj. C. R. Young, 98 Hilton Ave., Toronto, Ont., for 50c. postpaid.

# Snapshots in Coal Mining

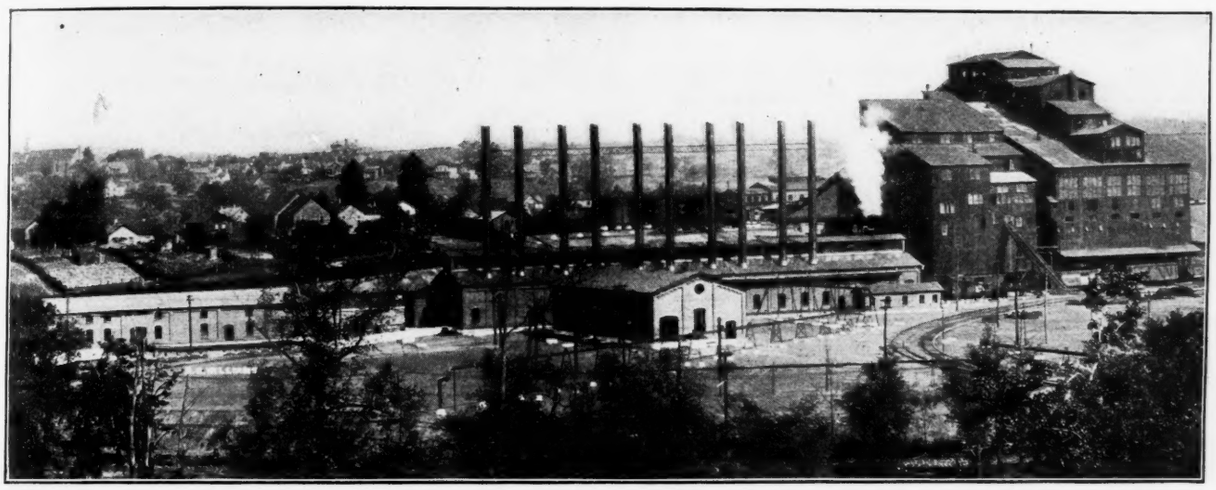
TYPICAL EASTERN KENTUCKY MINING CAMP NEAR HAZARD

TIMBERING IN ENTRY OF HARLAN COAL MINING CO., HARLAN COUNTY, KY.

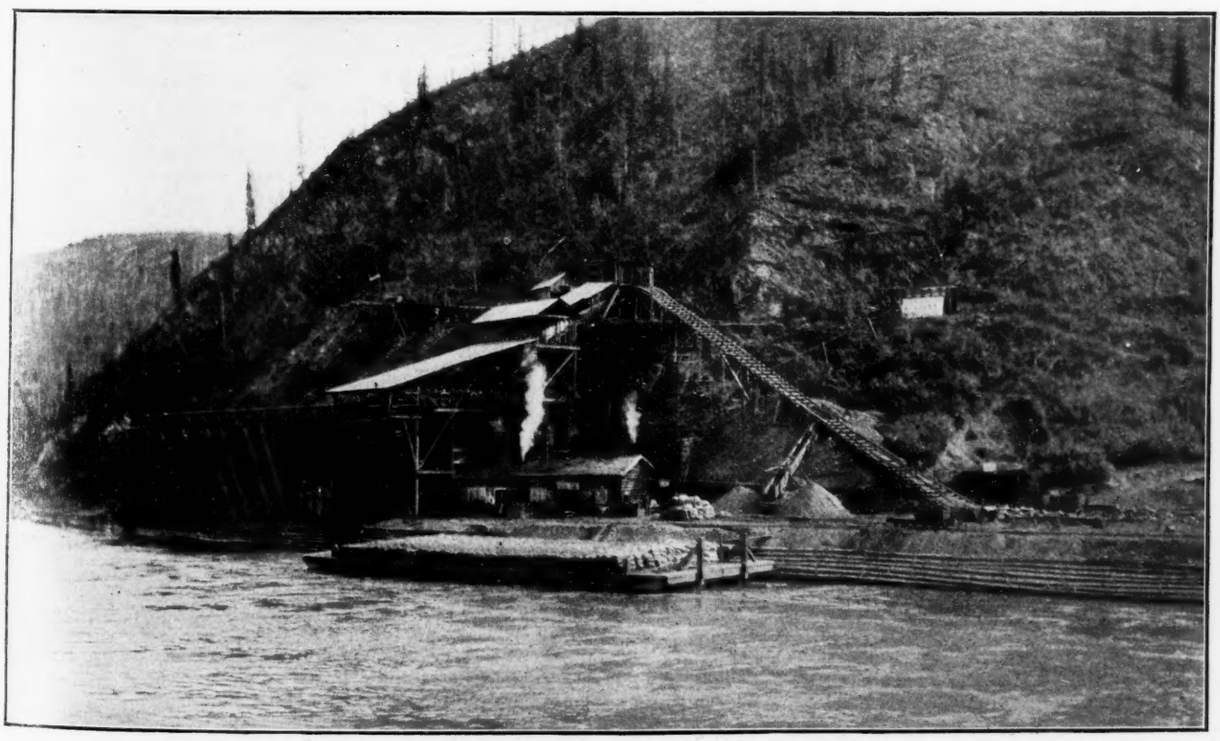
NO. 10 TIPPLE OF DAVIS COLLIERY CO., BOWER, W. VA.



NO. 2 TIPPLE OF DAVIS COLLIERY CO., SIVAD, W. VA.



PENNSYLVANIA COAL CO.'S OLD FORGE COLLIERY, OLD FORGE, PENN.



THE TANTULAS COAL MINE ON SOUTH BANK OF YUKON RIVER, LATITUDE NORTH 62

Produces a fair grade of bituminous. Photograph was taken by George Watkin Evans

# Power Department

## Christopher Coal Mining Co.'s Power Plant at Christopher, Ill.

By A. W. Spaht*

*SYNOPSIS—Although the power plant is located at the mouth of the shaft, an electric hoist is employed. For some time this held the hoisting record for southern Illinois. This is one of the extremely few coal mine plants using superheated steam.*

The power plant at the No. 2 mine of the Christopher Coad Mining Co. is one of the most modern coal-mine plants in the Illinois field. It is located at the mouth of the shaft and is two miles from Christopher.

The building is of brick construction and is fireproof throughout. There is a basement under the generator room and under the boiler room.

The generators, switchboard, exciters, hoisting equipment, motor-generator sets and one bank of transformers are placed in the engine room. The generating equipment consists of two 937- and one 3125-kva. turbo-generators. The large machine carries the day load and the smaller ones the night load. The turbines are operated under 165 lb. steam pressure and a 28 to 29-in. vacuum. The condensing equipment is located in the basement under the generators.

Surface condensers are used. The small units are provided with centrifugal circulating pumps and Edwards air pumps. The large unit has all centrifugal pumps mounted on a common base with the steam turbine that drives them. The circulating water from all the units is cooled by means of a system of spray nozzles. The circulating pumps furnish sufficient pressure to spray the water.

### Adequate Instruments Are Provided

The switchboard consists of 20 panels, including a Tirrill regulator panel. The board is equipped with graphic volt meter and graphic kilowatt meter, also a totalizing watt-hour meter. Watt-hour meters are also provided on the various feeders and a daily record is kept of the kilowatt hours required for hoisting, cutting and hauling, ventilating, and for sizing the coal.

Three exciters are employed; one is steam turbine driven and two are driven by induction motors. Two are of 17½-kw. capacity while the other is a 35-kw. machine. The smaller ones will excite any two generators and the third will excite all three machines.

The hoisting equipment consists of a 1150-hp., 550-volt, direct-current motor direct-connected to the 7-ft. cylindrical drum hoist. Power for this motor is supplied from a motor-generator having a 650-hp., 2300-volt alternating-current motor, an 885-kw., 550-volt, direct-current generator, a 17-kw., 125-volt exciter, and an 11-ton flywheel. The set runs at 600 r.p.m. synchronous speed. This hoist has held the southern Illinois record, having hoisted 4923 tons in 8 hr. The depth of the shaft is 600 ft.

Two 300-kw. synchronous motor-generator sets are used for converting the 2300-volt alternating current to 275-volt direct-current for use underground. The motors on these sets are rated at 435 kva. for power-factor correction. The station power factor is from 90 to 95 per cent.

The bank of three 50-kva. transformers in the generator room furnishes 220-volt current for the tipple, rescreener, shop and coal and ash-handling motors, and for lighting the bottom and on top. The lighting on the bottom is unique in that it is a modified system of indirect lighting. The illumination thus obtained is decidedly better than that ordinarily found and goes far toward preventing accidents. An out-door bank of transformers is provided for the fan. This machine is driven by a 150-hp. three-speed motor. Two motors are provided on a common base with a pulley between them. Either motor may be used by simply changing friction clutches. This gives a spare motor on the fan always ready.

In the boiler room are four 500-hp. Stirling boilers set in two batteries. There is space for an additional battery of two more. The boilers are fitted with superheaters giving 100 deg. of superheat. Soot blowers are also provided and mechanical stokers are used. The feed water is treated before entering the boilers. The water softener is on the boiler-room floor.

### Recording Instruments Are Used in the Boiler Room

The boiler room is provided with indicating and recording feed-water meter, draft gages, thermometers showing the temperature of the feed water, the superheater, flue gases, and condensate water. Instruments for determining the $CO_2$ and the CO in the flue gases are provided. There is also an instrument in the boiler room that indicates the load on the station. This is a great help to the firemen, as it shows them at all times the changes in load and they can then regulate the fires accordingly. Draft is secured by means of a concrete stack 12 ft. in inside diameter and 225 ft. high. A 100-ton cement-lined steel coal bunker is placed in front of and above each pair of boilers.

The fuel consists mainly of refuse from the picking tables and degradation from the rescreener. The rest is taken from the No. 5 bin of the rescreener. The refuse is crushed and mixed with the other fuel and is all carried to the bunkers by means of conveyors and elevators. This fuel runs high in ash, but the ashes are dumped into pits under the grates and are raked by hand onto a 24-in. cast-iron flight conveyor which takes them to the railroad cars. The railroad furnishes special cinder cars and uses the cinders for ballast along its tracks.

The water-supply is taken from a 100-million-gallon reservoir, which depends on rainfall. While this water is

*Electrical engineer, Christopher Coal Mining Co., Christopher, Ill.

not unusually bad, it has been found profitable to treat it. Lime and soda ash are used for this purpose.

There are two feed pumps, one a four-stage centrifugal and the other a duplex. The centrifugal pump has been found decidedly better than a plunger pump. The feed-water temperature is 210 deg. F., but no trouble whatever has been experienced because of this high temperature.

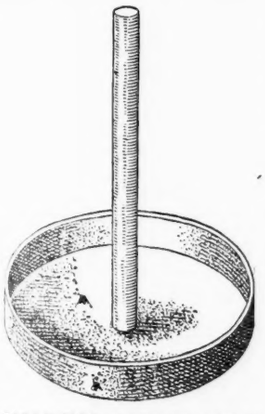
The No. 2 mine is electrically operated throughout; in addition the No. 1 mine has a 300-kw. motor-generator set and a 125-hp. motor driving the fan, both receiving power from this power house.

A market has been found for considerable night load and the surplus day load. A public service company has built a line to the plant and several towns are lighted by power from this source. The voltage is stepped up to 33,000 volts and delivered to the lighting company at this potential. Three 600-kva. transformers are provided for this purpose. These, together with the lightning arresters, are housed in a separate brick building near the power house.

The plant is handled by nine men, working three shifts of 8 hr. each. There are three engineers, three firemen, two ashmen and one coalman, making three men to the shift.

## Substitute for Regular Valves

It is sometimes difficult, says a writer of experience in a recent issue of *Power,* to get repair parts when located in a country power plant. The way one man overcame such a difficulty in getting new pump valves, when the old ones had been ground down at various times until they were so thin that they warped and the stem holes were enlarged so that considerable water was lost through, them, was as follows: A cardboard box lid, the same diameter as the valves, was secured, and an iron rod the diameter of the valve stem was placed in the center, as shown in the illustration. A mixture of lead and babbitt was melted and poured into the lid. This process was repeated for the required number of valves, several cardboard lids being used in the operation. A sheet of fine sandpaper was tacked down on a board, and the castings were rubbed over it until a fairly smooth face was secured. These valves gave such good service that they were left in permanently. When they started to leak, they were simply removed and "sandpaper faced" again.



MOLD FOR PUMP VALVES

**Large Slack Piles 25 to 30 Years Old** in the Indiana block-coal fields are now being sold at a profit. This slack accumulated in former years when there was no market for screenings and was dumped in huge piles on the surface. It is now being loaded into cars as rapidly as possible and sold to industrial plants for steam coal. The country around Brazil is dotted with these slack piles. In some instances they have caught fire and have burned slowly for many years. When reloaded this slack is sold at $1 per ton. Many farmers are glad to have the slack removed from their land and are receiving a royalty of 5c. per ton.

## RECENT LEGAL DECISIONS

**Assignment of Merchandise Coupon Books Issued to Employees**—Provision printed in merchandise coupon books issued by coal companies to employees in Kentucky in payment of wages that such books shall not be transferable does not prevent assignment of the employee's legal right to demand payment in cash on the books. But in a suit to so recover, an assignee must join his assignor as a party plaintiff. (Kentucky Court of Appeals, Pond Creek Coal Co. vs. Riley Lester & Bros., 188 Southwestern Reporter, 907.)

**Liability on Corporate Stock Subscriptions**—One who has signed a written subscription for stock in a corporation in process of organization, whereby others are induced to make subscriptions, or to extend credit to the company, will not be permitted to escape liability, to the disadvantage of such other subscribers or the creditors, by showing that there was a secret understanding with the promoters of the company that the subscription would not be enforced. (North Carolina Supreme Court, Boushall vs. Stronach, 90 Southeastern Reporter, 198.)

**Iowa Workmen's Compensation Act Applied**—Under the Iowa Workmen's Compensation Act, where a miner was employed more than a full year immediately before being permanently and totally disabled for work in the course of his employment, and he had earned $5 a week or more, he should be awarded 50 per cent. of his average weekly wage received at the time of the accident, subject to a maximum of $10 per week, for not more than 400 weeks. (Iowa Supreme Court, Richards vs. Central Iowa Fuel Co., 159 Northwestern Reporter, 696.)

**Dealer's Liability for Coalhole Accident**—Judgment cannot be entered against a retail coal dealer on account of injury to a pedestrian through falling into a coalhole in the sidewalk in front of a customer's premises, on the cover of the hole being left off, on a mere showing that coal from the dealer's yard was delivered shortly before the accident. There must be proof that the persons who used the hole in unloading the coal were actually the dealer's employees. (New York Supreme Court, Appellate Term; Strominger vs. Hencken & Willenbrock Co.; 160 New York Supplement, 1079.)

**Injury to Machine Operators Through Loaders' Negligence—Duties Concerning Inspection**—Loaders in a mine, engaged in preparing rooms for reëntry by machinemen, are not "fellow servants" of the latter employees, within the rule of law exonerating mine owners and other employers from liability for injuries sustained through negligence of fellow servants. But a machineman is not entitled to recover for injuries sustained through the existence of an obviously defective condition of a mine roof, discoverable on such inspection as his duties required him to make. (Kentucky Court of Appeals, Music vs. Consolidation Coal Co., 189 Southwestern Reporter, 200.)

**Injury to Coal Mine Driver**—A mine employee engaged in driving a mule was injured through jumping from a car and alighting on sills lying along the side of the track, when the mule began to kick. Held, that he is entitled to recover damages from his employer if the mule was vicious to the employer's knowledge, and if the employee was not warned of the danger of the animal kicking, and acted with reasonable prudence in jumping, considering all the surrounding circumstances. The employing operator cannot escape liability on the theory that the presence of the sills lying beside the track was the direct cause of the accident and due to negligence of a certified mine foreman, for which the operator would not be responsible. (Pennsylvania Supreme Court, Robel vs. Philadelphia & Reading Coal and Iron Co., 98 Atlantic Reporter, 959.)

**Operator's Liability for Fall of Mine Roof**—The fact that a miner injured while operating an undercutting machine, through fall of a mine roof, claimed that he could not have discovered the defects which caused the accident by the use of ordinary tests, was not inconsistent with his assertion of liability on the part of his employer through failure of the mineboss to inspect the mine properly and furnish timbers, as required by the Indiana mining laws. "The discharge of such statutory duties are in no way dependent upon or modified by the ability, the diligence, or want of diligence of the employee in discovering and remedying defects in the place he is required to work, and which by the provisions of the statute the employer is bound to make safe in the manner and by the means therein described." (Indiana Appellate Court, Vandalia Coal Co. vs. Shephard, 113 Northeastern Reporter, 767.)

# The Labor Situation

## General Labor Review

The miners of No. 14 colliery of the Lehigh Coal and Navigation Co., who struck for "consideration pay," returned to work after a two-weeks' strike. The strike of the 1200 mine workers of the Gravity slope of the Delaware & Hudson Co., near Archbald, Penn., which has lasted two weeks, has come to an end. While it lasted the Archbald people found it difficult to secure coal for their cellars. The dispute has been with regard to the payment for machine mining. It has not been settled, but the issue is to be discussed with General Superintendent Cadwallader Evans, and pending the settlement the mine will work. The hoisting engineers of the Lehigh Valley Coal and Navigation Co. are threatening a strike. They demand $100 a month. About 9000 men are affected and these will very likely be idle if the threatened strike takes place.

In the Portage district of Cambria County, central Pennsylvania, 4000 miners have gone on strike against the "standard weight" for loading mine cars. In the Pittsburgh district, along the Monongahela River, 85 men have brought suit against the Pittsburgh Coal Co. because that company deducted $4 a piece from their wages as penalty under the agreement for a four-days' strike.

#### Mine Workers Want Old-Age Pensions in Ohio

The miners of the eastern Ohio subdistrict will hold their annual meeting at Wheeling, W. Va., on Mar. 13. The mine workers will be addressed by Herbert S. Bigelow, the chairman of the last Ohio constitution. He will present plans for old-age pensions. The mine workers are endeavoring to obtain sufficient signatures in order that the proposition may be submitted to the voters of Ohio in a referendum in the near future.

It is gratifying to report that the Guyandotte Coal Operators' Association, of West Virginia, has decided to grant a 10 per cent. increase in wages to take effect Mar. 1. It will be the second increase in six months. Though the association has acted favorably on the increase, it will not compel all its members to grant the advance. The choice will be left to the preference of each individual member. This decision, it is said, was reached at a meeting held Feb. 10.

The M-B Coal and Coke Co., of Kimberly and Elkridge, on Armstrong Creek in Fayette County, West Virginia, has agreed to give its men a bonus of 10 per cent. following the example that has been set by several of the other West Virginia operators.

#### Changes in Union Personnel in West Virginia

George Hargrove, who has been in the Kanawha district of West Virginia, and who is a member of the international executive board of the United Mine Workers, has been transferred to Madisonville, where he will endeavor to build up the organization in western Kentucky. Thomas Haggerty, who took such a part in the organization of West Virginia, has turned in his resignation to the international board, which resignation has been accepted.

Labor conditions in the Kansas field are no worse than last week. The mine workers returned to work in Plant No. 19 of the Western Coal and Mining Co., near Pittsburg, after striking for a new locker house. They demand one in which all the lockers will be on the ground level. In the present building some of the lockers are on top of others and the men have to reach to a height of 5 ft. or more to have access to them. The state mine inspector said he was unable to find anything in the law requiring companies to maintain all the lockers on the low level; and the men were advised by the union officials to return to work.

#### To Pay Miners for Powder in Missed Shots

The difficulty relating to mechanical shotfiring is still unsettled. Alex Howat, the district president, has discussed the matter with the local union officials. The operators are willing to pay 75c. for the powder lost when shots fail, but they will not pay for the time lost unless the fault is not the men's. The operators argue that if they paid the men for a day's work whenever a shot failed, they could easily cut a wire or misplace a fuse whenever they wanted to get a vacation on pay.

## Strike Against $1600 Fine

Under the head "Discipline," in the contract made by the United Mine Workers of America, District No. 5, and the Pittsburgh District operators, are the following clauses:

No strike or stoppage of work shall occur at any mine until the question in dispute shall have been considered and finally disposed of by the Joint Board provided for in this contract.

(a) Should any officer, or officers, of the United Mine Workers of America, or any members thereof employed at any mine, cause the mine or any part of the mine to shut down in violation of this rule, each member of the United Mine Workers of America employed at said mine, except those who continue at work, shall have deducted from his earnings the sum of $1 per day for each day or part of a day they remain idle.

A similar rule operative against the employer is provided for lockouts. Then follows this clause:

(c) All money assessed against employees under this rule shall be collected from the pay for the half month in which the violation of the rule occurs or from the first money due thereafter. All moneys assessed against the operator for violation of the rule shall be turned over to District No. 5 of the United Mine Workers of America, and all moneys assessed against the miners shall be turned over to the Pittsburgh Coal Operators' Association.

The employees of the Eclipse mine near Roscoe, Penn., operated by the Pittsburgh Coal Co., recently went on strike for four days, and the company held out $4 from the pay of each of its men. As 400 men were implicated, the company kept $1600 out of a total pay of about $18,000. Suits have been filed against the company by 85 of the men to recover the pay thus withheld. If the justice's court concedes the contention of the miners no appeal can be taken, as the amount sued for is too small to confer that right on the defendant.

The system of fining incorporated in the agreement has been somewhat generally approved by mine workers' representatives. They appear to believe that the operator will be able to discipline the mine workers where the union is unable to do it. As a matter of fact, whenever fines are imposed a strike results and the matter is settled by a compromise, and the clause falls flat. The Roscoe men appear to have taken another tack. If it is unsuccessful, they will probably resort to a strike, as has happened in other places. While only 85 will go so far as to file a suit, it is likely that no one will refuse to go on strike if the suits fail, so little respect is evinced for the binding force of contracts.

## Objections to "Standard" Weight

A strike against the practice of having a standard weight for cars has involved four or five thousand mine workers at 25 mines near Portage, Penn. The companies affected by the strike are the Portage Coal Mining Co., the Miller Coal Co., the Trout Run Mining Co., the Forge Coal Mining Co., the Beachley Coal Mining Co., the Forge Co., the Portage Smokeless Coal Co., George Pearce & Sons, the Thermal Smokeless Coal Co., the Penker Coal Co., the Martin's Branch Coal Mining Co., the Logan Coal Co., the Yellow Run Coal Co. and the Henrietta Coal Co.

The exact conditions of this strike are not quite clear. The companies allege that cars loaded with more than 3000 lb. do not give enough clearance in low headings. Consequently, the companies have refused to pay for any coal loaded above 3000 lb. In the past many concerns have declared that as loading more on a car than it was built to carry bent the car axles and injured the cars, they would not permit of such loading and would not pay for more coal than constituted a fair loading. As a matter of fact, however, many of these same companies continuously permitted the loading of the same cars with rock to the level of the sides, which was a greater injury to the cars than they would suffer by any loading with coal, no matter how high it might be built up.

It was generally known that such companies required the men to overload their cars and then refused to pay for any more than the standard weight. By this iniquitous proceeding the scale was violated. It is not clear that this has been

true at these Cambria County mines—the regulation may have a perfectly reasonable origin—but the evil practice of securing an overweight, at least in the past, has been only too common elsewhere; and the operators as a body will do well to insist that the practice cease.

The overloading of cars is not good for car axles; it causes the spilling of much coal, thus making mine explosions more likely and derailments more frequent. It also makes the riding of the cars by the trip rider dangerous and in a far minor degree makes perilous the act of passing by loaded cars which are traveling at speed. But these are usually not the real reasons for establishing a "standard"; in fact, most of them are never even alleged as the reason. Most companies want their cars loaded as high as possible, and some few companies desire to receive a full load and yet pay for a minimum load only. In fact this practice is one into which the companies in the operators' associations would do well to inquire, for it constitutes a form of unfair competition; and this fact may interest them even if the unfairness of the practice to the miner does not spur them to regulative action.

### One Clause Seems To Sustain Standard Car

No one ought to regret the passing of the "standard car" if the regulation is used as it has been in the past. It has no place in the Central Pennsylvania scale, except in the clause, "All the customs, conditions and provisions existing under the 1914 scale agreement to remain unchanged during the period covered by this agreement, except as modified or changed by the following rules and regulations."

As the coal cars can be most generously loaded where the coal is high, it is the operators with the thick coal who gain most by the standard-car provision. Thus those who are best able to pay for every pound they get are the very persons who have most readily evaded payment by this ingenious provision.

Seeing that the companies are short of men, so that the workingmen have matters pretty well in hand, it might be suggested that they load the coal continuously below the standard and thus avoid being docked for overweight. The shortage of mine cars and the higher cost of living is probably creating a desire on the part of the miners to load their cars to the limit. There is no real injustice in the standard weight, if no pressure is used to induce the miner to load above it. The companies have as much right to impose it on the miner as the railroad has a right to compel the mine operator to observe it in loading gondolas and box-cars.

## William S. Hughes

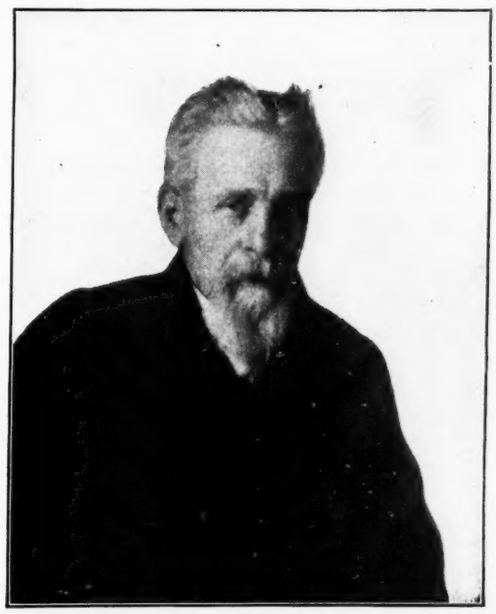
It is with deep regret that *Coal Age* records the close of an eventful career of one of the pioneers in the safety-lamp industry. For a little less than 40 years, the name of William S. Hughes has been prominent in the manufacture of safety lamps in this country, and the business he established in 1880, at Scranton, Penn., has grown until it far exceeded the expectations of its founder. It included not only the manufacture of mine safety lamps, but embraced mine and other equipment in brass, bronze and aluminum. In later years, the business was assumed by the sons of Mr. Hughes and became widely known as "Hughes Bros. Brass Works."

William S. Hughes was born in Pembra, South Wales, Dec. 11, 1844. Graduating from school at an early age, Mr. Hughes entered the employ of Evans Thomas, at Aberdare, Wales. Mr. Thomas conducted a general hardware business, but made a specialty of the manufacture of safety lamps. One of these early types of approved safety lamps still survives and is known as the "Evans Thomas lamp."

Mr. Hughes became much interested in safety-lamp manufacture and suggested some important improvements in the Evans Thomas lamps, of which there were then a number of different types. The characteristic feature of these lamps was the special manner in which the intake and discharge openings of the lamp were protected. A diaphragm was used to deflect the air, which entered the lamp through openings in the lower portion of the bonnet, so that it did not impinge directly on the gauze. The discharge at the top of the chimney was likewise protected by a conical shield. It is not known just what credit is due Mr. Hughes for these improvements, but that his ingenuity assisted largely in the development of these lamps there can be little doubt.

It was in 1880 that Mr. Hughes migrated to America. At that time all safety lamps and their supplies were imported here, which suggested to Mr. Hughes' active mind the opportunity of starting their manufacture in the anthracite region of Pennsylvania, where the mines mostly generated gas. The first attempt in this line was the manufacture of lamp gauzes, which were then sewed by hand, instead of being seamed as they are today.

A few years later, about 1890, Mr. Hughes began the manufacture of safety lamps of different types, which became known as the "Hughes lamps" and were used in all the collieries of the anthracite region and throughout the West and Canada. For 15 years he conducted the business successfully, retiring 12 years ago from his active responsibilities, which were then assumed by his two sons, William H. and Ralph W. Hughes, who still constitute the firm known as Hughes Bros., at Scranton, Penn.



WILLIAM S. HUGHES

About a year ago the subject of our sketch complained of a small lump on his neck, which grew very rapidly. The specialists who were consulted announced that it was a tumor that could not be removed on account of its being immediately over the jugular vein. The continued growth of the tumor caused the death of this pioneer of the anthracite region on the seventh day of December last, just four days before his seventy-second birthday. To within four months of the end, Mr. Hughes claimed to feel as young as he did at 50. A week before he passed away, he was forming plans for the summer.

Always cheerful, Mr. Hughes had a bright smile and an encouraging word for all who entered the door of his shop or his home. He was always optimistic, and the success of the business he established nearly 40 years ago is a monument to his industry and faithfulness. *Coal Age* extends its warmest sympathy to the sons and daughters who survive.

# Editorials

## The Anthracite Price Inquiry

Probably the most striking statement made in the report of the Pennsylvania Anthracite Coal Commission was: "While the conclusion of the commission will doubtless not be popular, it is founded upon the bald facts developed by this investigation, and it is impossible under these facts that your commission should find other than they do."

Of course, their conclusions that the increase in the cost of coal was justified, that there has been no collusion between either operators or retailers, and that the latter do not enjoy "particularly large returns," are important. This is so chiefly because while these facts have long been patent to all connected with the coal trade, they have now been authenticated with the official stamp of the state's investigation.

To be sure, the final result, as the commission more or less gracefully acknowledges, will not be popular. Obviously the commission had some suspicion of what was expected from it, and this would seem to us to be proof of the sagacity of the men composing it. An investigation of this nature would never have been started if it was thought the results would be as has now been divulged. Certainly the commission is to be commended for the thoroughness and apparent honesty with which it has completed its task, and the report should be of much value. Read it on another page.

## The Southern Negro's Place in the Sun

A condition that is at the same time both difficult and anomalous is at present confronting those who are responsible for the management of industrial plants and mining operations in the South.

A strong feeling of unrest is evident among the negro miners and workmen who comprise 50 to 75 per cent. of the total population in many Southern mining villages. This unrest has manifested itself in the migration of thousands of reliable and heretofore loyal negro workers to mining districts and munition factories located in the North. It is conservatively estimated that 5000 negroes have left the Birmingham, Ala., mining districts in the last six months. Labor agencies have sprung into being overnight which are run by unscrupulous agents who fatten themselves at the expense of Southern operators, and perhaps of their Northern brethren too; for the negro must be thoroughly understood and properly handled to get the best results from his labor—even in the South.

Recently there has been a slight lull in the constant movement of negroes Northward; but, nevertheless, there is a strong undercurrent of feeling that when spring breaks the migration will continue on an even larger scale.

What is the reason for this exodus of negroes from the South, especially when wages are higher and work steadier than ever before? Southern managements must give serious study to this question and should by all means discover the answer.

In the main, the negro is fairly and humanely treated by the companies he works for in the South, but the managements of some of these companies have not been regardful of the kind of treatment accorded the race by the officers of the law (particularly the hundreds of fee-grabbers that still infest the South by reason of crude statutes which admit of thousands of arrests and convictions for petty offenses, from which the white man is immune only because of race). Southern managers know this is a fact. Observing this for years, they have been derelict in pressing the passage of better laws.

True, Alabama has passed laws abolishing the fee system in the larger counties; but in Jefferson County, the heart of the great Birmingham mining region, it will be two years before the arrest and jailing of a negro for a trivial offense such as "crapshooting," to yield a fee of four or five dollars to county officials, is stopped. In Tennessee similar conditions prevail. In some Tennessee cities a night court is in vogue as an adjunct of the fee system. Negroes are arrested on the job, taken to the night court, fined and sent back to work—all in the hour. It is clearly up to Southern managers to stop these practices.

At some operations there is still room for a better treatment of the negro. He is "cussed at" far more than he is fairly taught. Poor housing and unhealthful living conditions at some points afford a good reason for his leaving. The tubercular death rate among negroes is very high.

Clearly the negro laborer and miner is entitled to his place in the sun. It is hardly possible to believe that this place is anywhere else than in his Southern habitat. It has been fairly demonstrated that the foreign-born workman cannot replace the negro in the South. It must be remembered by Southern managers that he is being educated all the time. Strong leaders of the race are arising throughout the South to teach the negro what is best for him. The practice of abusing the race naturally grows more obnoxious.

There should be no further exodus of Southern negroes. It is up to the Southern managements to wisely avoid it. There is good ground for believing that it can be done. *Coal Age* hopes it will.

## What the Agreements Require

The agreements between the miners and the operators are extremely loose in some particulars. Both parties apparently seem satisfied to have it so. As the contract clauses have usually been interpreted, they do not bind the workman to the signing employers for a term of years to work for a given rate of pay. Hence, the men can leave the employment of the operators who have signed the agreement and can go to work in a competitive industry or for a competitor in the same industry.

A miner may leave coal getting for munition making if he sees he can get a higher wage. He can work at a "wagon" or a nonunion mine if in flush times a higher wage is being paid there. No question has been raised as yet to the right of a union man to do this if he will, but it is easy to see that he makes the contract null and void by doing so. He removes from the operator who has conceded a scale a large part of the advantage of having made a contract. But somehow, slackly enough, he is permitted in this simple manner to destroy his contract if he will.

Conversely, the operator has been known to bring his coal from nonunion regions and leave his union men idle. This has been objected to as being a violation of the agreement, but the mine workers have not denounced it very severely. Both resort to nonunion regions and nonunion industry and leave union regions and union industry whenever it seems profitable. One party becomes attracted by the nonunion conditions when times are good, the other finds them enticing when times are bad.

The operator is regarded as saying in the contract: "I agree to pay union wages at this mine, but I do not agree to give the mine its full proportion of my contracts or to refrain from filling my orders elsewhere if it appears more profitable." The miner is held to say: "If I work at your mine, I will be satisfied with such and such a wage; but I am at liberty to leave your works and ask what I will at a rival mine where there is no agreement or at an industrial establishment of another kind."

The mine worker would regard it as a great hardship if he were held under his contract to work at his trade or at a union mine when better pay could be obtained elsewhere or at a nonunion operation. He holds, despite contract provisions, that he has a right to work when he will and abstain when he will. He may quit at his pleasure, though the right of his employer to discharge him is not by any means so clear.

In the Southwest the mine worker controls the operator "both going and coming." The right to be hired is as zealously guarded as the right not to be discharged, but there are no compensating responsibilities. The mine worker may quit whenever he is disposed. He sheds his contract just as a crab sheds its shell. In short he says, "I come, I stay and I go at my imperious pleasure."

The dispute of the Chicago and Carterville Coal Co. reminds us that there are other loosenesses and "permissivities" in the contract. The price put on coal, powder, dynamite, etc., in the agreement is not usually regarded as compelling the mine workers to buy those supplies of the coal company. In general only where the quality of the powder is restricted to some "permissible" is any control on the purchase of powder exercised. In many cases there would be a loud outcry if the operator would insist that the mine worker must buy of the company and not at the coöperative store in which the mine employee has invested his money.

But when the cost of powder and other things go up, and trade in such materials is pursued by the company at a steadily growing loss, the miner is sure that the company should supply at the old price all these articles which the mine worker would not buy of him when they were cheaper in the open market.

Perhaps it would be best for the companies not to be too logical. Political economy and logic, the two "dismal studies," do not appeal to the workman. He sees the contract as his Bill of Rights. It restrains his employer and it frees him, for when it galls him he casts it off, and where it makes the employer squirm it is a sacred document never to be disregarded. Nevertheless, a certain *noblesse oblige* leads the operator to fall in with these ideas however unfair he believes them to be.

## Success

Perhaps the most interesting number of *Coal Age* that was ever published was the Success Number printed the first week in last April. We have made this special issue an annual affair, and on April 7 intend to get out our 1917 Success Number.

There isn't a man engaged in mining but can write a good success story concerning something or somebody connected with his particular company. We want to tell of successful men, mines, methods and machines. The man does not have to be president, general manager or superintendent of the company. We would like to tell about some fellows who haven't had half a chance, but who in spite of their limited opportunities have raised themselves to positions of trust and have won the sincere respect of their employers and associates.

This success number in April will be the biggest issue of its kind ever printed. A copy will go to practically every mine in the United States. Fifteen or twenty thousand coal-mining men will look it over and read the articles in its pages. Every article printed in this issue will help hundreds of other men in their daily work. We appeal to all of our readers to coöperate with us.

Of course, every article is paid for, but the chief remuneration to a contributor is the prestige and the friends that result from such efforts. The articles must be in our hands by Mar. 20, and if at all possible each contribution should be accompanied by a photograph or drawing to illustrate the subject. All contributions will be handled in the order of their receipt; if more articles than can be published in this particular issue are received by us, those coming first will be given preference. All others will be published in subsequent issues. Don't wait —do it today.

## Working a 3-Ft. Bed of Coal

In the Feb. 10 issue of *Coal Age*, on page 260, we published Samuel Dean's article, "Methods of Working a 3-Ft. Bed of Coal Pitching 10 to 20 Deg." Fig. 1 used to illustrate Mr. Dean's article was not the correct illustration. In the rush of making up the pages this drawing was inserted and the error not discovered in time to correct the mistake. Fig. 1, as shown in the article, is the drawing that was used to illustrate the paper of Messrs, Dodge, Smith and King read at the same meeting of the Rocky Mountain Coal Mining Institute and published on page 312 in *Coal Age* last week. This error in substituting the wrong Fig. 1 must have caused some confusion to our readers. We trust, however, the paper was entirely intelligible, notwithstanding the mistake. Discussion on the questions brought up by Mr. Dean's paper are coming in rapidly. We want all of those who are familiar with the problems involved to write us their opinions at once. Study Mr. Dean's paper and write us a letter today, basing your ideas on your own personal experience.

# Discussion by Readers

## Posting Certificates in Company Office

*Letter No. 1*—Allow me to say a word in defense of the action of our chief mine inspector in Colorado, in requesting or demanding that the certificates of all mine officials shall be posted in the office of the company, for the convenience of inspection at any time they may be needed. This matter was referred to in the reply to an inquiry by a Colorado miner, *Coal Age,* Feb. 3, p. 247.

I fully agree with the editorial comment following this inquiry, which draws attention to the fact that the chief mine inspector of Colorado is a man who has acquired "a reputation for fairness and is an intelligent, painstaking and efficient inspector, fully acquainted with the duties of his office." Mr. Dalrymple's record as an inspector, it will be generally admitted, is beyond reproach. He has devoted his life to the business of coal mining and has always been ready to advance any proposition for the benefit and safety of mine workers.

By way of review, allow me to refer to the last coal mining report (1915), for the state of Colorado, issued a short time ago. In the introduction of this report, page 8, Mr. Dalrymple publishes a circular letter that he sent to the mine operators in the state, under date of Dec. 30, 1915. In reference to the examination of mines by certified firebosses, the letter reads as follows:

> On and after Mar. 1, 1916, all coal mines will have to be examined in the morning, prior to other employees entering, by a certified fireboss or other person eligible to act as fireboss. Open lights are strictly prohibited in making this examination; an electric light may be used in conjunction with the safety lamp.
>
> All coal mines which generate sufficient gas to enable its detection in an approved safety lamp must employ a certified first-class mine foreman, and when an assistant is necessary he must hold a first-class foreman's or assistant foreman's certificate. Those holding second-class certificates can only be employed as foremen or assistant foremen in nongaseous mines. All assistant foremen can act in their respective capacities as foremen, in case of emergency or in the absence of the foreman.
>
> Those holding examiner's and foreman's or first-class foreman's or first-class assistant foreman's certificates are eligible for fireboss. First-class assistant foremen are eligible as second-class foremen.
>
> All mine official certificates, including shotfirers, must be posted in the office at the mine to enable the state inspectors to determine the eligibility of the officials. The intent of this letter is for greater safety to life and property, and I sincerely hope that it will meet with your approval.
>
> JAMES DALRYMPLE,
> State Inspector of Coal Mines.

As has been stated in *Coal Age,* there is no provision in the mining law of the State of Colorado authorizing the inspector to demand that certificates of mine officials shall be posted in the company office. However, Mr. Dalrymple took this action only after consulting and receiving the approval of the Board of Examiners, who hold the power to grant and revoke the certificates. The step also received the sanction of many of the larger coal operators, being a matter that would greatly assist in the speedy settlement of cases in dispute.

By way of illustration, let me suppose that an inspector pays a visit to a mine that has been classed as a "nongaseous mine," but finds that some gas is now being generated in the workings, which fact would change the classification to that of a "gaseous mine" and require that the mine foreman should hold a first-class certificate. Now, if the certificates are posted in the company office, no trouble will be experienced in deciding the question of the eligibility of the present foreman to hold his position in the mine, under the new classification.

The posting of the certificates in the office of the company can do no one any harm and is purely a matter of convenience. It is my opinion that the chief mine inspector was justified in making this demand, which is in the interest of safety and is not in conflict with any of the existing statutes. I am basing my opinion on a residence of 30 years in Colorado and an intimate knowledge of coal mining in the state. ROBERT A. MARSHALL.

Walsenburg, Colo.

## Working 3-Ft. Coal Pitching 10 to 20 Deg.

*Letter No. 1*—In answer to the questions asked in the foreword, *Coal Age,* Feb. 10, having reference to the article of Samuel Dean, on page 260 of the same issue, regarding the methods of working a 3-ft. bed of coal pitching from 10 to 20 deg., permit me to offer the following, numbering my answers to correspond to the questions asked in the foreword:

1. Assuming a 3-ft. seam of bituminous coal, pitching, say 20 deg. in the Pennsylvania bituminous region, I would adopt the room-and-pillar method of working, using ordinary mine props, for solid work, and "chocks" or "cogs," for pillar work.

In regard to the gage of track and size of mine car, I would say the gage should not exceed 24 in. or be less than 18 in. I would use a 20-in. gage and a mine car having a capacity not to exceed a half-ton or 1000 lb. Such a car can be made of thin steel and mounted on a truck having 8-in. wheels. The inside depth of the car should not exceed 18 in. This car would not be difficult to handle either empty or loaded.

2. Where the coal is overlaid with a hard sandstone roof and bottom is to be lifted, as specified in the second question, in order to provide the necessary headroom on the entries, I would use the same plan of working as that just described.

3. For coal cutting, I would employ a compressed-air chain, breast machine, which could be operated with good results under the conditions named. The Bituminous Mine Law of Pennsylvania makes ample provision for avoiding the danger of explosions of gas. The requirements of that law should be followed in every respect.

4. My experience with coal-cutting machines leads me to believe that there is no danger to be anticipated from the ignition of gas by sparks from the cutting bits. I have seen these machines operated where it was possible to ignite the gas in the cut under the coal by an open

light, but ignition never took place by the sparking of the bits.

5. I have never known gas to be ignited by sparks with a miner's pick coming in contact with coal or sulphur balls, and do not believe this is ordinarily possible.

6. Assuming that the working places are driven to the rise, the coal should be lowered from the working face to the gangway by inclined planes, the descending loaded car pulling up the empty. Main- and tail-rope haulage should be used on the main roads to haul the trips to the shaft bottom; or it may be possible to use small mules where the haul is not great.

7. As stated previously, I would use the room-and-pillar system of working.

8. In using the room-and-pillar method, I would lay off the work in panels to permit of driving rooms 300 ft. deep, on 28-ft. centers, by driving butt headings to the rise 1200 ft. apart.

9. I have had no experience with face conveyors, in longwall mining.

10. I have already described the low car with 8-in. wheels and having a capacity of 1000 lb. that would be adapted for use in this seam.

West Leisenring, Penn. ROBERT W. LIGHTBURN.

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*Letter No. 2*—In answer to the first two questions in the foreword, *Coal Age*, Feb. 10, regarding the track gage and capacity of mine car to be used in working a 3-ft. seam of coal on a pitch varying from 10 to 20 deg., allow me to say that I would be inclined to use a car having a capacity of from 3000 to 3500 lb. and a track gage of 36 in.

I would let the 12-in. drawslate fall on all roads, in entries and rooms alike. On the haulage roads, I would take down 22 in. of the roof slate, so as to provide at least 5 ft. of clear headroom above the rail. But, in the second case, where the roof is a hard sandstone, this should be left undisturbed and the bottom should be lifted so as to give the same headroom on the roads. It would be necessary, also, to lift some bottom in the rooms.

Inasmuch as this mine is assumed to be generating gas, I would use a compressed-air undercutting machine for mining the coal; but if the amount of gas generated is comparatively small, I believe it would be of advantage to use an electric coal cutter and employ electric locomotives for haulage.

### GAS IGNITED BY A SPARK FROM A PICK

Questions 4 and 5 both relate to the ignition of gas by a spark caused by the cutting bits of a machine or a miner's pick, striking against the hard coal or a sulphur ball. In this regard, I have had first-hand experience. Some years ago, I was employed in a semibituminous coal seam, at Glyn-Neath, Wales. The mine was worked on the pillar-and-stall system and the coal was 9 ft. in thickness.

The chamber I was driving had reached the limit, and I was told to start a crosscut 6 ft. wide to connect with the foot of the slope. This crosscut was to be driven in the top bench of coal, which was 3 ft. 6 in. thick. All went well until we were in about 20 ft. on the crosscut, when we had some trouble with gas and were obliged to brush it out, each morning, with our coats, which was the practice in that mine. After brushing out the gas in this manner, we would not be bothered again while at work during the day.

However, it happened about 10 o'clock one morning that I was called to set some timbers on the main heading. On returning to the crosscut, about 2 o'clock that afternoon, I detected the smell of gas in the place but thought there was not enough to do any harm and, taking up my pick, began sidecutting the coal. In a short time the pick struck a sulphur ball in the coal near to the roof. Immediately there was a flash caused by the burning gas, which had been ignited by a spark from the pick. Fortunately, there was only a little gas present, and I escaped with a slight singeing. However, it was enough to prove that gas could be ignited by a spark struck by a pick.

In regard to the system of haulage, I would employ an electric locomotive, installing overhead trolley wires and making the haulage road the intake airway of the mine. For the purpose of gathering the coal I would use storage locomotives or mules.

### DESCRIBING A MODIFIED LONGWALL SYSTEM

Replying to the seventh question, I would work this seam by the longwall system of mining. My plan would be to leave a solid shaft pillar 300 ft. square. A heading 20 ft. wide should be driven through this pillar on both sides of the shaft and made to serve as the shaft bottom. From the end of the shaft pillar, roads should be driven north, south, east or west, according to the inclination of the seam, taking care that the direction of these roads will favor the movement of the loaded cars toward the shaft.

It has been my custom to drive the crossroads 27 ft. wide, which provides for a 12-ft. roadway and a space 15 ft. wide for the storage of waste. These openings are driven in pairs with a 30-ft. pillar between them, which makes the total distance out to out of rib 84 ft.

From the crossroads, chambers are turned on 42 ft. centers and driven 12 ft. wide for a distance of 10 yd. At this point a longwall face is started by connecting the chambers so as to form a single breast of from six to eight working places. Between this and the next set of chambers, a pillar 50 ft. wide is left. The longwall breast is driven up 300 ft. and a chain pillar 30 ft. wide is left between this face and the next heading.

My reason for driving the headings 27 ft. wide, as just explained, is to give ample storage room for the waste taken from the top or bottom to give sufficient headroom on the roads. This plan, also, affords a good opportunity for putting in a siding or passing track, wherever this is desired. The only expense will be the removal of the waste and brushing the top or lifting bottom, as the case may be.

In my opinion, the longwall system in its various modifications has not been given a fair trial in this country, and its advantages are not as fully appreciated on this account. In the majority of cases, I believe it would be found to be vastly preferable to the room-and-pillar system, both from the standpoint of economy and as affording a larger percentage of extraction and a reduction in the number of mine accidents.

In regard to face conveyors, in longwall mining, it is my opinion that their use provides a paying system, particularly when the coal is overlaid with a hard sandstone rock. When using mine cars having a capacity of

3000 to 3500 lb., the conveyor system employed for loading the cars at the face will be found of great advantage. Where cars of less capacity are used, however, face conveyors cannot be recommended.

Regarding the size of mine car required, I would suggest the use of cars 10 ft. long, 4 ft. wide and 1 ft. deep, inside dimensions. This would provide for a "topping" of from 6 to 9 in. There is a great difference in loaders. Some miners will load from 10 to 15, or even 20 tons more than their neighbor in an adjoining chamber, on the same number of cars, or with the same turn, in a period of about two weeks. CYMRO.

Carbondale, Penn.

## Mine-Accident Record

*Letter No. 11*—Kindly allow me to correct the news item published in *Coal Age*, Feb. 3, p. 250, describing the recent accident that happened in the "Dundee shaft" of the Loomis colliery, when one man was killed. It was the chain attaching the bucket to the rope that broke. There were not "two men" on the bucket, and it was not being "hoisted" at the time, as stated in the news item.

As nearly as can be ascertained, this accident is supposed to have happened about as follows: The Dundee shaft had been idle for a few days and water had accumulated at the bottom. A bucket attached by a chain to the end of a rope was being used to bail the water from the shaft.

Two men were stationed on a platform 260 ft. below the surface. It was their duty to see that the bucket was properly started when the engineer began to hoist. The man who was killed had gone to the surface and was about to return on the descending bucket.

For the purpose of steadying the bucket and keeping it from turning and twisting in the shaft when being hoisted and lowered, what is called a "billy" was used. This consisted of a crosspiece running on the shaft guides and serving to hold the rope supporting the bucket central in the shaft. The bucket was attached to the rope by a chain below the billy.

It is supposed that when the man stepped on the bucket and the engineer started to lower him in the shaft, the billy remained caught or frozen to the guides at the top of the shaft. When the bucket had descended some distance it is thought that the billy became loosened and fell with great force, breaking the attachment of the bucket chain to the rope and dropping bucket and man to the bottom.

The story of the lowering of a rope with chain attachment and the hoisting of one of the men who had "just enough strength remaining to cling to the chain" had its origin in the brain of some local newspaper reporter.

I want to suggest that an engineer when operating a hoist of this character should always hoist the bucket, say 10 or 12 in., so as to loosen the billy from the guides before starting to lower it into the shaft, whenever there is danger that the device may be frozen to the guides.

Nanticoke, Penn. W. A. BARRETT.

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*Letter No. 12*—From the various reports of state mine inspectors, it appears that fully 60 per cent. of mine accidents that have occurred during the past 20 years are classified as due to fall of roof or coal.

Several years ago an old miner left his place one day and went home because, as he said, "the roof was bad." The next morning the man was killed 20 min. after starting to work under the same roof beneath which he had refused to work the day before.

Three months ago another miner was killed by a fall of rock, in the mine where I am now employed. This man was ordered home for the day by the safety inspector; but, after the inspector left the place, the miner returned and started to drill a hole and was caught by a fall of roof before the hole was finished.

It is the same old story repeated time and again. In 99 cases out of 100, the victim of the accident has no one to blame but himself. The accident is caused by his neglect to pull down a piece of loose top, or set a post where it is needed, before loading a car or drilling a hole. His anxiety to load the clean coal first is almost certain to result in a fatal accident to himself or his laborer. The number of these accidents exceed those due to the explosion of powder or gas and the movement of cars, combined.

### SINGLE FATALITIES, OCCURRING OFTEN, OUTNUMBER GREAT MINING DISASTERS

Because this class of accidents only maims or kills one or two men at a time, the awful consequences that result from the miner's neglect to do promptly what is necessary for safety can only be properly appreciated by studying the records of these fatalities for a year or a term of years. On the other hand, an explosion of gas or coal dust that snuffs out many lives in a single moment excites the horror of the entire country.

The small news item, announcing the death of John Smith, a miner at ——— colliery, owing to a fall of slate, receives but passing notice, but by its constant repetition outweighs all other mine casualties. The miner who would not think of opening a safety lamp in a gassy place does not hesitate to work under a dangerous piece of roof, assuming that it will not fall until he has finished his task. The same man does not hesitate to return to the face immediately after firing a shot, notwithstanding the place is full of smoke and he knows that the shot may have loosened the roof over his head.

### A SUGGESTION TO MINE FOREMEN

Since miners are furnished with all needed timber to make their places safe, at no expense to themselves, it is only justice to blame a man when he is the victim of his own neglect or recklessness. It is clearly impossible for a mine foreman or his assistant to stand over every miner and see that his instructions are obeyed. There is, however, another way of enforcing obedience to mine regulations. This can be accomplished by a suitable method of discipline for disobedience of instructions or violation of rules and regulations. It is the lack of discipline that invites accidents.

Foremen should visit working places at unexpected times, and when men are found working contrary to rules and instructions, they should be laid off or penalized in a way that they will remember. A few acts of discipline along this line would soon bring men to terms who are now prone to disregard instructions and run their own chances of safety.

Every superintendent should impress on his foremen and their assistants that he will hold them accountable for maintaining strict discipline in the mine. It must be understood that there can be no appeal from a penalty

imposed by the mine foreman. The superintendent who does not, in this manner, insure strict discipline in the mine is in part responsible for accidents that happen from this cause. FRED B. HICKS.

Plymouth, Penn.

## Checking In-and-Out System in Mines

*Letter No. 8*—I want to describe a system employed at our mine, that I believe is satisfactory in showing the exact number of men underground and the places where they are working. It is as follows:

A board is prepared showing a separate line for each entry in the mine and separate lines for drivers, trappers, motormen, cagers and trackmen or timbermen. These lines extend horizontally across the board and are provided with hooks spaced at regular intervals apart. The checks are numbered consecutively from one up, for each line on the board.

By way of illustration, suppose the first ten rooms on the 1-E entry have been worked out and abandoned, and there are eight rooms working on this entry. If all the men are in their places and working, the line marked 1-E on the board will show checks 11 to 18 inclusive. In other words, for the sake of checking the men in and out of the mine each man uses the check number corresponding to the number of the room in which he is working and hangs it on one of the hooks in the line on the board corresponding to his entry.

The same system is followed for each entry in the mine. Thus, if 12 rooms have been worked out and abandoned on the 1-W entry, and 15 rooms are working, the checks on the board in the line marked 1-W will be numbered 13 to 27 inclusive, when all the men are in their places. The drivers are numbered consecutively from one up, and their checks are hung on the line marked "drivers." The same is true for each of the other classes of daymen.

When passing into the mine, each man must hang his check in its proper line on the board, showing that he is working in the room corresponding to that check number. Again, on coming out of the mine he must take his check from the board. This system has given good satisfaction in our mine and has enabled the timekeeper or weighman in charge of the board to tell just what men are underground and where they can be found. If a man is changed from one room to another on the same entry, or from one entry to another, he must use the check corresponding to his new place. C. W. CARRUTH.

Hartford, Ark.

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*Letter No. 9*—The following system has given good satisfaction at a certain large colliery employing close to 700 men underground. At this mine there is a checking office in charge of a checking clerk, who is on duty from 6 to 7 a.m., for the purpose of handing each man his check as he goes to work.

In place of the usual form of checking board, the checking office is equipped with a turnstile, having as many arms as there are sections in the mine. On each arm is mounted a check board containing hooks, which are numbered to correspond to the check numbers of the men working in that section. The checking clerk is again on hand from 3 to 4 p.m., for the purpose of receiving the checks of the men coming out of the mine and placing them on their proper hooks on the check boards.

Before going to his home, it is the duty of each boss in charge of a section of the mine to look over his board to see if all the men have come out and returned their checks. If one of the hooks is empty, he concludes that the man is still underground and, after allowing a sufficient time for him to come to the surface, it becomes the duty of the boss to look him up or send someone after him to see if he is hurt. The checking office is located at a place convenient to the opening of the mine

Each section board is given a surplus number of hooks to provide for the greatest number of men that may be employed in that section. As men are constantly changing from one section of the mine to another, it is the custom for each section boss to keep a book called the "Life-Check Book," in which is registered the name, life-check number, payroll number and the location of each man working in his section.

The common practice is to make these entries in pencil so that they can be easily erased when a man is changed to another place. If a man changes from one section of the mine to another his name is recorded by the boss in charge of that section and he is given a new life-check number.

As there are many different systems of checking in use in mines, time is not wasted in studying these different systems, for the purpose of adopting any points of superiority in other systems that would improve the one in use.

Universal, Ind. WILLIAM JARDINE.

## Electric Substations in Mines

*Letter No. 3*—The purpose of installing a substation in a mine is to save a large outlay for copper. It is well known that a high-voltage current requires a much smaller wire for its transmission than a current of lower voltage.

It frequently happens that the conditions in a mine are such that the best point for distributing the power is at a considerable distance inby from the mine entrance or the foot of the shaft. In such a case it is clear that there would be a great saving in copper by using a high voltage, say 2200 volts, for transmitting the electric current to the point in the mine where it is to be distributed. At this point it will be necessary to transform the current or step it down to a working voltage, say 500 or 250 volts as may be required.

For the transmission of the high-voltage current from the power station to the distributing point or substation in the mine, it may be possible to use a No. 10 or No. 12 (B. & S.) wire, having a diameter of practically $\frac{1}{10}$ or $\frac{1}{12}$ of an inch.

At the substation, the high-potential current is transformed to one of a lower voltage, which will require larger wires for its transmission to the working face, where it is to be used for the operation of coal cutters and drills. For this transmission a 00- or even a 0000-wire will be required. The 00-wire has a diameter of practically $\frac{3}{8}$ of an inch, while the diameter of the 0000-wire is a little less than $\frac{1}{2}$ in. When it is remembered that a 0000-wire contains more than 20 times the weight of copper in a No. 10-wire of the same length it is evident that a great saving is effected by adopting a high-voltage transmission for long distances.

When the current is to be taken down a shaft, a lead-protected cable should be used, and this should be in-

stalled in a box having a section of, say 8x24 in., the purpose of the box being to prevent the lead covering of the cable being injured by an accidental blow, or by any object falling down the shaft. There should be a switch for cutting out the current, both at the top and the bottom of the shaft.

In my opinion the best method of conducting the current down a slope and through the mine is to spike two 6-in. boards to the timbers on one side of the road and carry the cable over insulators fastened firmly to these boards, as shown in the accompanying sketch. The cable should be further protected by hanging a guard-board from the roof so as to prevent the injury of the cables and contact of men and animals with them. Such high-power lines should, of course, in all cases be installed in the intake airway. This is required by the Bituminous Mine Law of Pennsylvania. The substation must be built entirely of fireproof material, such as brick or concrete. The station must be well ventilated with fresh, clean air. When the installation is properly made by a competent electrician, there is, in my opinion, little danger in locating it at a suitable point in the mine.

SAFEGUARDING HIGH-POWER LINES

MINE ELECTRICIAN.

Smock, Penn.

## Bonus System in Mining

*Letter No. 12*—While I am not sure that it is possible to advance any new arguments in favor of the adoption of a bonus system in coal mining, I want to suggest that there are three general factors, or principles, involved.

The adoption of the bonus system has three objects in view: (1) Increased production; (2) increased safety and (3) increased good will. The system should, in all cases, be adapted to the particular conditions in the mine and should be broad enough to include all classes of workers in and about the mine. Surface and underground employees alike should be given an equal opportunity to increase their earnings, and the bonus should be merited in every case.

In my opinion, all bonuses that are offered should be based on an average production. I believe this will have a better effect than to set the standard higher than the average. To place the standard too high will incite many to undue haste in the performance of their duties, while others will neglect certain details, exercise less care and often fail to take the precautions necessary for the safe execution of their work.

It will be generally admitted that nothing is gained by boosting the output of a 1000-ton mine to 1250 tons one day, when it is likely to drop back to 750 tons the day following. The incentive to good work and uniform production should be strengthened by penalizing underproduction.

Without wishing to minimize the difficulties that stand in the way of the adoption of a bonus system in mining, I believe that these sink into comparative insignificance as one studies the conditions involved. In a sense the desired objects that I have mentioned are interdependent, since the prevalence of good will and safety in a mine will naturally result in an increased production of coal.

Safety should be a prerequisite in any bonus system. I fully realize the possibility, which has been suggested by other writers, that a motorman may take dangerous chances in an effort to make an extra trip; loaders may neglect to pull down loose slate or set needed timbers promptly when required and continue to load their coal under bad roof; timbermen may be led to do their work hastily and take unwarranted risks; even trapper boys may lose themselves in day dreams of what they can buy with their extra earnings and fail in their duties.

To overcome these tendencies to haste and neglect, the standard of accomplishment should not be based alone on quantity of work performed, but the quality of the work should receive due regard. This can be effected through a system of credits given each worker by the foreman and his assistants in charge, such credits being based on faithfulness and efficiency.

Allow me to suggest that one phase of a successful bonus system would be an individual bonus for full time during one month or one pay. Unavoidable absences should not be charged against an employee. Under such an arrangement there would be fewer layoffs for minor causes, such as snowstorms, ball games, etc.

In closing, permit me to say that I would favor no system that did not produce results. While firmly believing in the bonus system in general, I regard with equal favor the plan of "payment per day per ton"—a combination of piecework and day wage. This plan was ably advocated in an editorial published in *Coal Age,* Vol. 8, p. 848. The summation of the arguments there presented was in the following words: "In fact a combination of a minimum wage plus a lower rate of remuneration per ton of output is the logical way to pay for every operation around the mine." I believe, as far as its provisions apply, this plan would give much the same results as those claimed by advocates of the bonus system, and present fewer difficulties in its adoption. I think the plan of "payment per day per ton" is worthy of discussion and hope to see it considered from all viewpoints by *Coal Age* contributors.

GEORGE N. LANTZ.

New Straitsville, Ohio.

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*Letter No. 13*—It is my belief that the bonus system can be successfully applied in coal mining, although it has often proved disastrous, largely because there has been no provision made to insure safety and to prevent men from being careless in their haste to perform their work. Let me mention two cases in my own experience in the old country.

The first instance occurred in connection with the celebration, in France, of what was known as the "*Quinzaine Sainte Barbe,*" which lasted two weeks. During that time there was a big rush of the miners to secure the large premiums offered by the company to secure an extra output of coal. So anxious were the men to obtain the bonus, that they paid little attention to making themselves safe, and the result was that many accidents occurred.

Miners would go to work as early as 4 o'clock in the morning and come out as late as 8 o'clock in the evening. While the company was doing everything it could to prevent accidents, the eagerness of the men to get out the coal was so great that if a man was killed it made little difference, and the work went on as usual.

Instead of going down the ladders in the manway, many were so anxious to reach the shaft bottom quickly and get

their pick of the best timbers that they would climb over the shaft gates and slide down the iron ropes. They would choose the timbers that were softest and easiest to cut, so as to gain time. It is little wonder that there was more than one man missing at the church when mass was celebrated on the fourth day of December following.

The second instance refers to the premiums or bonuses offered to the underground officials for the saving of mine timber. In this arrangement due allowance was made for places where more timber was required, owing to roof difficulties. All the district foremen were anxious to use as little timber as possible and, in doing this, they tried hard to avoid accidents from falls of roof, because there was a fine imposed for every accident that took place. To avoid these accidents required the exercise of their best judgment in determining what timber was actually necessary in a place.

In their endeavors to avoid any waste of timber the foremen would visit each working place each day to find out for themselves what timber was needed. Each foreman would then leave a note for the nightman, telling him what timber to distribute in the different places. If a miner was caught cutting off 6 in. from a post that was too long, he was fined for the waste, as timbers of any desired length could be had for the asking.

My experience in this country leads me to favor the bonus system wherever it is practicable. Our company is paying a 10 per cent. bonus to all employees who make good, and there is never any trouble at this mine.

Peru, Ill. GASTON LIBIEZ.

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*Letter No. 14*—Since my letter explaining the proper use of a bonus system as one means of improving the conditions in coal mining, *Coal Age*, Nov. 11, p. 815, I have read with interest the various criticisms that have been made of this project. Having waited until those interested have had opportunity to express their views, I would like to claim the right to close the debate by replying to some of my critics. Let me say, first, that any subject which is invulnerable to attack or criticism would be uninteresting. One who is sincere will admit that honest criticism reveals the weak points in an argument and suggests means of overcoming its difficulties.

One writer, signing himself "Experience," Dec. 30, p. 1099, approves of the offering of a bonus "where it will not induce men to disregard safety"; but mentions several instances where he considers the offering of a bonus to be "a gamble on human life."

That any efficient bonus system must involve the promotion of discipline, increase safety and tend to lower the accident record in mines, I heartily agree. And I question whether anyone can attribute a mine accident to a bonus system that is properly applied and adapted to meet the conditions prevailing in the mine. The same accident might have happened in the absence of any bonus system. The exercise of common sense by all parties concerned is an important factor in coal mining as well as in other industries.

In the application of a suitable bonus system, the mine management must remember that the breaking of previous records does not always result in a saving of time, labor and material. I am no advocate of measures that lead men to howl for results beyond the endurance of man or mining equipment. A motorman cannot exceed a safe limit of speed and make a reckless run, and still be eligible for a bonus that should be conditioned on the faithful and efficient performance of his duties.

Another correspondent, Dec. 2, p. 939, claims that mining conditions are not uniform enough to permit of an equable and practicable application of the bonus system in the various kinds of work performed. My belief is that a properly developed bonus system should tend to realize greater uniformity in the work of mining. If this condition already existed in our mines, there would be no need of the offering of a bonus.

### INTERDEPENDENCY OF MINE WORKERS

Another writer objects to the bonus system, on the ground that "every mine worker is dependent, to a certain extent, on some one else and this dependency affords them many loopholes for shifting the blame to other shoulders," Dec. 16, p. 1019. I want to say that there is no consistency in offering a bonus to the motorman hauling from the inside parting to the tipple, unless a like inducement is offered to the gathering motormen who gather the cars from the coal face; to the trackmen who keep the track in good condition; to the machinemen who cut the coal, and the miners and loaders who alike contribute their share in supplying the daily output. The division of the bonus should be made on an equitable basis that is adapted to the work performed. On such a basis, the bonus referred to above would be granted or withheld as a whole, no individual worker receiving his share to the exclusion of the others.

An instance is given in Letter No. 4, Dec. 9, p. 977, in which a bonus system gave good results for a considerable time but eventually failed because a new motorman became dissatisfied and demanded the same bonus as was paid to the old men who had been longer in the service. This man pushed his claim and got it, although later, on the adoption of a new wage scale, the bonus system was abandoned.

### BONUS SYSTEM IN UNION MINES

In another letter, Nov. 11, p. 815, William W. Miller claims that "the bonus system cannot be applied to mines operated under union contracts." The reason given is that labor officials would use the maximum bonus as a base for a uniform wage scale, in framing another contract. It is not my purpose to discuss the probable demands of organized labor further than to say that it would not be reasonable to base a demand for a new wage scale on the bonus paid, unless the scale was conditioned on the same results for which the bonus was awarded. Such a demand would naturally result in doing away with the bonus system altogether.

It is gratifying to note that labor and capital are assuming a more conciliatory attitude toward each other, although neither will tolerate excessive demands on the part of the other. It is my opinion that the success of the bonus system in nonunion mines will prove the possibility of its successful application in the operation of union mines. W. H. NOONE.

Thomas, W. Va.

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Letter No. 14 will close the discussion of "Bonus System in Mining." Owing to the great similarity in the methods described in the letters on "Checking In-and-Out System in Mines" and the large number of contributors, the discussion of that subject will close with the letters now on hand and yet to appear.

# Examination Questions

## Alabama Second-Class Examination, Held July 24-27, 1916

(*Selected Questions*)

*Ques.*—Describe how you would construct a good, cheap and durable brattice in breakthroughs on entries and in rooms.

*Ans.*—A common practice of constructing air stoppings in breakthroughs on entries is to build a double wall of slate and fill the space between the two walls with road dirt or other available refuse that would serve to make an air-tight partition. This style of stopping, however, must be carefully watched and repaired from time to time to keep it air-tight. A more durable entry stopping is one built of brick laid in good mortar. Where clay is plentiful in the mine, this can be utilized for filling all cracks and crevices so as to prevent the leakage of air. A more substantial but at the same time more expensive stopping, is one built of concrete.

The stoppings built in the breakthroughs between rooms generally consist of the broken slate and rock built into the openings. The care given the building of stoppings in rooms will depend largely on the distance a room is to be driven and the condition of the ventilation at the working face. It is important, however, to build good stoppings on all entries in order to maintain a good circulation of air throughout the workings.

*Ques.*—What is the general rule for timbering a room 30 ft. wide with a tender roof?

*Ans.*—There is no general rule for timbering under these conditions, except it may be the adoption of a systematic form of timbering in which the posts are set in rows 4 ft. apart and parallel to the face of the room. The posts in each row are set the same distance apart and those in each alternate row are staggered, or stood halfway between the posts in front of them. There are two or three lines of posts in each room and, as the face advances, the posts in the rear row are brought forward and stood in a row nearer the face. Rooms should not be driven 30 ft. wide under a tender roof.

*Ques.*—How many different kinds of explosives does the law allow to be used in one drillhole?

*Ans.*—Only one kind of explosive should be used in a single hole.

*Ques.*—Which is the safest explosive to be used in a coal mine, black powder, dynamite or permissibles, and why?

*Ans.*—The explosives known as permissible explosives are the safest to employ for the blasting of coal in mines. The reason is that this class of explosives has been particularly made to meet the dangerous conditions that develop in the blasting of coal, especially where gas is present at the working face. Permissible powders have received the careful attention and have passed the tests required by the Federal Bureau of Mines. In the explosion of permissible powder there is a less volume of flame and less danger of the ignition of gas and dust.

*Ques.*—If you found your air current was insufficient, how would you proceed to remedy the same without installing new machinery?

*Ans.*—Clean up the airways and see that all crosscuts and breakthroughs in entries and rooms are at least as large in section as the area of the airway and unobstructed. Permit no empty or loaded cars to stand in the entries or block any of the air passages. Study the general plan of ventilation with a view to shortening the distance the air must travel. Wherever practicable, split the air current when it is possible to do this without too far reducing the velocity of the air at the working face. As far as possible, avoid sharp corners and abrupt changes in the direction of the air current. In fact, remove every obstruction to the passage of the air through the mine. In special cases it may be possible by changing the direction of the circulation to take advantage of natural air columns that are formed in the dip and rise workings of the mine.

*Ques.*—What must be carefully considered before the work of drawing pillars is begun?

*Ans.*—Before starting to draw back entry pillars, the question of whether there is any available coal, which could be reached by driving the entries farther, should be decided. Before drawing room pillars, the possible effect that would be produced on both the adjoining workings of the mine and the overlying surface should be carefully considered. The possible presence of water or gas in the overlying strata should also be taken into account and the necessary precautions adopted to safeguard the mine in that event. The strength of the pillars and the proper control of the roof pressure must be carefully studied, and the work of drawing back the pillars so conducted that a uniform line of break or settlement shall be maintained.

*Ques.*—How can a mine foreman best gain and hold the respect of the workmen and always have his instructions carried out?

*Ans.*—A foreman can best gain and hold the respect of his men by treating them as he would like to be treated were he in their place. He must treat them as men and not as machines. He must be fair-minded, always listen to their complaints, keep his word of promise and do what he can to remove their difficulties. He must treat all men alike, have no favorites and extend no privileges. He must be firm in all his dealings and demand a day's work for a day's pay.

*Ques.*—Give reasons why different methods of mining are used, and why one method will not answer for all mines.

*Ans.*—Owing to the varying conditions of mining, with respect to the depth of cover, nature of the roof, floor and coal, inclination of the seam, presence of slips and fault lines in the roof or pronounced cleats in the coal, the presence of gas or water in the formations and similar varying conditions, the methods of mining differ greatly. All of the conditions named require different treatment to enable the successful and complete extraction of the coal.

# Coal and Coke News

## Washington, D. C.

Inasmuch as the Interstate Commerce Commission has taken jurisdiction of car distribution cases, the complaints filed with it on this score are increasing daily and practically all of them come from coal mining companies. In practically every case it is alleged that the roads have discriminated in the matter of distributing coal cars to the mines and reparation is desired in most of them. While these matters are pending the members of the Commission are prevailing upon Congress to enact an amendment to the law which will make it clear beyond a doubt that it has jurisdiction in this matter. A majority of the Commission contend that the Federal body now has authority, but they have joined with the minority in asking for the amendment to the law in order to remove all doubt.

A complaint against new rules regarding the distribution of coal cars was recently filed with the Commission by the Glens Run Coal Co. of Cleveland, Ohio, naming the Wheeling & Lake Erie R.R. defendant. It was stated that the distribution rule adopted by this road on Apr. 1, 1916, enabled the complainant coal company to produce and ship in addition to the road's cars from 23,000 to 25,000 tons of coal per month. This rule was in operation during April, May, June and July. On Oct. 23, it was pointed out, the road adopted a new rule which stated that fuel supply cars of foreign railways and individual cars assigned by owners should be counted in as a part of the regular distribution. Regarding this the coal company claimed:

"That under this rule, which appears to be fair on its face, the defendant company has adopted a practice which has resulted in unjust discrimination against complainant and its great disadvantage with benefits to other shippers in the same district. This complainant states that the defendant company has failed continuously since the adoption of said rules of Oct. 23, 1916, to furnish complainant with its fair proportion of cars and has so interpreted said rule as to discriminate against this complainant and favor other coal companies by giving them a larger proportion of cars than is given to this complainant, so that this discrimination has resulted in reducing the cars available for shipment and has cut down the shipments of this complainant to less than 16,000 tons for the month of November, 1916, and less than 13,000 tons for the month of December, 1916, while cars wrongfully furnished to other companies by defendant have enabled the other companies to operate their mines to substantially their capacity during said period."

On Dec. 28, 1916, it was stated, the railroad further modified the distribution rule. In the new form it included the company's own fuel cars in the proportionment, and made other changes. The complainant coal company declared that the new and modified rule is contrary to the rulings of the Interstate Commerce Commission and otherwise discriminatory. It was further declared that at the time of the adoption of this later rule the coal company "had entered into contractual relations with various customers and that its tonnage was entirely sold and that it was not in a position to take on any assigned cars without violating the terms of its contract with its customers and that it was solely dependent for the transporation of its coal upon the system cars of the defendant."

The Commission was petitioned to for relief. A complaint against the minimum carload weight on coke maintained by the Atchison, Topeka & Santa Fe and the Southern Pacific railroads has been filed with the Interstate Commerce Commission by the Swastika Fuel Co., of Raton, New Mexico. It was pointed out that the minimum carload weight specified by these railroads was 50,000 lb. On account of the inadequate capacity of the cars furnished, it was declared, it was impossible to load them to the required minimum with coke of a light and bulky structure.

The complainants therefore requested the Commission to prescribe for the transportation of coke between New Mexico and points in California a rule providing in substance that "Minimum weight will be 50,000 lb., except where cars are loaded to full space or visible capacity, actual weight, but not less than 30,000 lb. will apply." The complainants also desired to be awarded reparation of $1611.05 on shipments already made.

### Uniform Specifications

A plan is on foot to have the Federal government adopt a plan for the uniform selection and purchase of coal for the use of the various branches of the Government. A bill to this effect is now pending before the House Committee on Mines and Mining which is designed to authorize the Bureau of Mines to make the necessary expert investigations the results of which would be adopted by the purchasing agents of the government. Testifying before the House committee, G. S. Pope, fuel engineer of the Bureau of Mines stated:

"The annual coal purchases of the Government amount to between $7,000,000 and $8,000,000. This fuel is selected and used sometimes in the most satisfactory manner, but frequently in ways inefficient and wasteful. The supervision of its use is sometimes expert, but is often far from satisfactory, so that engineers competent to judge are of the opinion that the practices of the Government in the economical use of its fuel are open to improvement of the same order of magnitude as have been realized by many large users of fuel when centralized, persistent effort has been made to reduce fuel costs. A saving as moderate as 10 per cent., which is believed to be well within a reasonable expectation, indicates the magnitude of the sum involved. There is at present waste in the selection of fuels, waste due to inefficient design of equipment, and waste in the manipulation of the fires. There is a lack of expert instruction given to the man firing the fuel, a frequent lack of information by plant managers as to what other plants are attaining, and a lack of knowledge of standards by which to measure actual performance.

The Bureau of Mines cannot instruct, but can act only in an advisory capacity, and our advice may be followed or not, as the department concerned may see fit. At the present time the bureau has no power by which it can compel the various departments of the Government to follow the instructions of the bureau. In order to secure this there must be some compelling force back of some agency of this kind, so that when the employees of the Bureau of Mines go into a plant and make their investigation we can see that their recommendations are carried out in a proper way, and not allow the continuance of a method by which the fireman is left to be the judge. The necessity of some such compelling force has been made apparent in the Interior Department, of which the Bureau of Mines is a branch. I refer to the Office of Indian Affairs, which purchases large quantities of coal for the use of the various Indian schools and agencies throughout the United States. It had been manifest to the Bureau for some years that by proper methods of selection, purchase, and use of fuel by that office, material advantages would accrue, but it was not until the Secretary of the Interior authorized and directed the Bureau of Mines to make an investigation of matters involving the selection of fuel and the installation of fuel-burning equipment in the Indian Service that engineers of the bureau were, during the current fiscal year, detailed to visit certain agencies for the express purpose of inspecting the fuel-burning equipment, ascertained the conditions under which the fuel is used, in order to decide whether or not the use of anthracite coal can be discontinued, and a lower-priced fuel substituted at a saving."

Among others to testify on the bill were P. M. Anderson, fuel engineer of the Bureau of Mines; James E. Jones of the General Supply Committee of the Government; Col. I. W. Littell, Quartermaster Corps, War Department; N. S. Thompson and J. H. Vawter of the Office of the Supervising Architect of the Government, and R. H. Chappell of the Bureau of Engraving and Printing. The bill met with some objection.

## HARRISBURG, PENN.

Following the suggestions of legislative leaders on increased revenue for the state, Representative David F. Davis, of Taylor, Lackawanna County, has introduced House bill No. 437, imposing a tax of 2½ per cent. ad valorem upon all coal mined in Pennsylvania, including bituminous as well as anthracite. Another measure House bill No. 436, dedicates one-half of the tax so collected to the several municipalities in which the coal is mined or washed.

The coal tax bill is patterned after the Dawson act of 1915, which fixed a tax of 2½ per cent. ad valorem upon anthracite coal. The Davis bill includes all coal in the state in order to eliminate the constitutional objections made by the Supreme Court against any tax upon a particular kind of coal.

The Supreme Court has not passed on the Dawson act, but it has declared the act of 1913, unconstitutional. As the Dawson act did not alter in any way the principle of the Roney act of 1913, there is no hope held that it will fare better on a question of constitutionality.

There is little likelihood that any tax of 2½ per cent. will be satisfactory to the representatives of the bituminous region. State leaders are of the opinion that a tax of 1 per cent. upon all coal, oil and gas would be ample, and a lower tax than 2½ per cent. would be necessary in order to prevent the possibility of burdening the bituminous industry of the state so that it cannot meet competition from neighboring states.

The bills introduced by Mr. Davis read as follows:

"Be it enacted, etc., . . . That from and after the passage of this act each and every ton of coal of the weight of 2240 lb. mined in this Commonwealth shall be subject to a tax of 2½ percentum of the value thereof when prepared for market which tax shall be assessed at the time when said coal has been mined and is ready for shipment or market.

It shall be the duty of the superintendent or other officer or person in charge of any mine, mines or washery to assess the tax hereby imposed from time to time as the said coal is mined or washed or prepared and ready for shipment or market and to ascertain and assess daily the number of gross tons of coal so mined or washed and prepared and ready for shipment or market and to fix the value thereof. That hereafter the said superintendent, officer or other person in each of said mine or mines or washery shall make report in writing under oath on the first day of each month and a detailed report on or before the tenth day of January in each and every year preceding to the Auditor General on blanks to be prepared by the Auditor General of the number of gross tons of coal hereby made taxable and the assessed value thereof during the month in the case of monthly reports and the calendar year in the case of yearly reports next preceding, showing the time when the said coal was mined or washed or made ready for shipment or for market, the number of gross tons thereof and the amount of tax assessed thereon. Provided that the total to be reported on or before the tenth day of January, 1918, shall be for the portion of the year 1917 after the approval of this act. The said superintendent, officer or other person in charge of such mine or mines or washer shall be entitled to receive as compensation for the service herein imposed upon him 1 per cent. of the amount of the tax collected, which sum shall be paid upon the warrant of the Auditor General out of the taxes so collected.

If the superintendent, officer or other person in charge of any mine or mines or washery shall fail or refuse to assess the said tax or to make monthly and annual reports as herein provided, the Auditor General is hereby authorized to appoint some person to go upon the ground and to assess from time to time coal made taxable by this act who shall make report to him of the same. The Auditor General may require the production of such books, papers, etc., for the ascertainment, valuation assessment and settlement of the tax as now provided by law, and may make an estimated settlement of the said tax either with or without the production of said books, papers and reports.

For every failure to assess said tax and to make report as required by this act the Auditor General shall disallow the compensation for said tax when settled as a penalty for such assessment and shall add 10 percentum for such failure. If any superintendent, officer or other person in charge of any mine, mines or washery shall fail to assess the said tax or if any person, firm, corporation, limited partnership or joint-stock association or any other owners, operators or lessees of any mine, etc., shall fail to cause the same to be done or make the reports required by this act, he or they shall be guilty of a misdemeanor and on conviction thereof shall be sentenced to pay a fine of $500 and undergo imprisonment not exceeding one year or both or either at the discretion of the court.

The tax hereby authorized shall be kept by the owner of the coal at the time the same is assessed as hereinbefore provided and shall be settled, levied and collected as now or hereafter provided by law for the settlement and collection of taxes on the capital stock of corporations now or hereafter provided by law.

Fifty per centum of the moneys derived from time to time from the tax collected under the provisions of this act is hereby permanently dedicated to the construction, maintenance, improvement and repairs of the state highways of the Commonwealth and shall be kept in a special fund for such purpose in the state treasury, separate and apart from the general revenues of the Commonwealth. The state treasurer shall be responsible for the safe keeping of and accounting for said fund in the

same manner and under the same penalties as for safe keeping of and accounting for other revenues of the Commonwealth.

The state treasurer shall on the first business day of each month make a report to the state highway commissioner of the money in said fund available for the use of the state highway department and the state treasurer and auditor general shall credit one-half of the amount so certified to an account for the construction and improvement of state highways and one-half to an account for the maintenance and repair of state highways. When so certified by the State Treasurer the funds shall be available for requisition and shall be requisitioned, expended, settled and vouched as provided by general laws for funds, etc., from the general revenue.

The several sections or provisions of this act are hereby declared to be independent of each other and it is the intent of the legislature that if any of said provisions shall be declared invalid it shall not affect any other section or provision thereof."

In the Davis bill No. 436, distributing the tax collected upon the total tonnage, one-half would go to the producing community, and this bill reads, "That 50 per centum of the moneys derived from time to time from the tax collected on coal in this Commonwealth is hereby permanently dedicated to the several cities, boroughs, and townships under which said coal is mined or in which the same is washed or prepared for market, which said sum shall be kept in a special fund for such purposes in the state treasury, separate and apart from the general revenues of the Commonwealth and shall be paid yearly by the state treasurer upon the warrant of the auditor general to the treasurers of the several counties at the time which said tax was received in proportion to the amount of the tax received from each of said counties and the treasurer of each of said counties shall within 30 days thereafter pay the same to the treasurers of the several cities, boroughs, and townships from which said coal is mined or in which the same is washed in said county, in pro rata share according to the population of the last preceding United States census. All moneys paid into the state treasury in pursuance of this act when so certified by the state treasurer are hereby specifically appropriated to the purposes hereinbefore mentioned."

These bills are attracting much attention, and legislators from both the anthracite and bituminous districts are watching the bills closely. It is expected that several hearings on these bills will be held by the Ways and Means committee.

## PENNSYLVANIA

### Anthracite

**Tuscarora** — Tracks are being laid by the Philadelphia & Reading Ry. to the big culm banks near here, which are known to contain millions of tons of coal. A washery will be erected and steam shovels put in operation. The Philadelphia & Reading Coal and Iron Co. has held these rich banks in reserve for years for use in case of strike, but it is said has resolved to use the coal now to prevent a panic in the coal market. A new colliery also will be erected soon on a tract containing millions of tons of coal.

**Scranton**—To further safeguard the 13th Armory from damage from mine settlings in the worked-out coal beds, drillers have started to sink boreholes, 2 ft. in diameter, from the Clark vein, where pillars have been built, to the Dunmore bed. The distance is about 100 ft. The inadequate pillars in the Clark bed, caused the cave that damaged the armory several years ago. Pillars in that vein have been strengthened by the building of 98 masonry pillars. The A. W. Drake Drilling Co. of Hazleton, is drilling the holes and it is estimated that it will take about five weeks to complete the work.

**Carbondale**—Thirty men employed by the Carbondale Coal Mining Co., have been temporarily laid off because of a squeeze in the workings of the company's mines. Should the subsidence prove to be of a serious nature it would affect No. 3 school which is located in close proximity of the cave zone.

**Pottsville**—The pay distributed, Feb. 15, among the Philadelphia & Reading Coal and Iron Co.'s employees in the Schuylkill region was the largest they have received in years. The mines have been working at full capacity during the last month.

### Bituminous

**Lilly**—The Lilly plant of the Kokomo Coal Co. has been sold to the J. Blair Kennerly interests of Philadelphia, and it is understood that the new owners are to make some extensive repairs and operate the mine on a large scale.

**Indiana**—Vernon F. Taylor of Indiana has purchased the Rochester tract of coal land in East Mahoning township for a large consideration. The new property adjoins his Savan Colliery Co. operation and it is rumered that a new opening will be started at once and the coal dumped over the present tipple of the Savan No. 1 mine. The company is also erecting several new miners' houses.

**Boswell**—The tipple of the Orenda No. 2 mine of the Merchants Coal Co. here was badly damaged by fire of unknown origin on Feb. 16. The loss will be in the neighborhood of $10,000.

**Blairsville**—Graff Brothers of this city have purchased the No. 2 operation of the Latrobe Coal Co. near Hillside and about 900 acres of adjoining coal. The deal includes the plant and equipment, houses and the coal tract. The property will be electrically equipped and a new opening put in. New houses and store will be built and the plans include an operation on a large scale. The output will be increased to about 1500 tons per day.

**Dubois**—Elias Phillips, Inspector of Mines for the Fourth bituminous district has given out some interesting figures in connection with his annual report to the Department of Mines. The total production of the district was 4,784,817, a decrease of almost 700,000 tons as compared with the production of 1915. This is due to changing the boundry lines of the district which removed some of the largest producing collieries. There were 6 fatal accidents in 1916, while in 1915 there were 7. The Shawmut Mining Co. was the district's largest producer with 854,113 tons.

**Brookville**—The McKnight Coal Co. of Brockwayville has entered suit in the Jefferson County courts against the Toby Coal Mining Co. of Brockwayville for $3175. It is alleged that the Toby company refused to fulfill a contract to furnish coal to the McKnight company at a contract price after a certain date and in order to fulfill the contract taken the McKnight company was compelled to purchase coal in the open market in order to keep the plant of the Ridgeway Dynamo and Engine Co. in operation for the remainder of the contract period. The Toby company contends that it supplied coal at the contract price for three months after the contract closed and on Jan. 1, 1916, refused to make further shipments. The case will be watched by the coal operators of this section with great interest.

**Marion Center**—The Savan mine of the Savan Coal Co. of Altoona has been reopened after a long abandonment. The mine was opened 50 years ago and was a large producer a few years ago but of late years it has been used only for country trade. W. I. Baugherty of Altoona, treasurer of the company, is on the ground and has full charge of reopening the property. The coal is hauled a distance of 4 mi. on a narrow-gage railroad to the tipple located on the Indiana branch of the B. R. & P. Ry.

**Punxsutawney**—The production of the twenty-eighth bituminous district, according to the annual report of the Inspector, Thomas Thompson, was 5,435,720 tons, an increase over 1915 production of 474,560 tons. The coke production was 75,870, a decrease from the 1915 production of over 50,000 tons. There were 10 fatal accidents in 1916, an increase of 3 over 1915. The Cowanshannock Coal and Coke Co. was the largest producer with 1,165,657 tons to its credit.

## WEST VIRGINIA

**Fairmont**—The Jamison mine No. 7, sealed after the explosion which wrecked the plant some months ago, still remains sealed although it is believed that the fire has been smothered. This mine will probably not be opened until the spring. When it is finally opened every modern improvement will be installed and the plant made thoroughly up to date.

**Morgantown**—The Scotts Run Coal Co. which recently opened a mine at Stumptown on the Morgantown & Wheeling Ry., made its first shipment of coal recently. This company expected to ship earlier but could not get cars.

**Charleston**—Thirty-two persons were killed in the mines of West Virginia during the month of January, according to the report of the Department of Mines; 22 deaths were caused from falling roof, coal and slate. Mine cars killed four men, while mining machines, a powder explosion, electricity, and a motor shaft each killed one.

**Huntington**—Announcement was recently made at the office of the Deegans coal interests, of the purchase by O. J. Deegans, of Logan, of the controlling interest in Guyan Valley Coal Co. This property was purchased from Walter Thurmond. Plans for the reorganization of the Guyan Valley Coal Co., if any exist, have not yet been made public.

**Grafton**—About 40 tipple mines have been opened along the different branches of the Monongah Division in the past few months, and the men required to work these mines number between 3000 and 5000. The tonnage of coal at present moving over the railroad has not greatly increased, owing to the shortage of labor in the mines and the lack of sufficient cars to move the output.

**Bluefield**—A 16-ft. bed of coal is reported to have been found in the mines of the Carter Red Ash Coal Co. at Raven, Va. Up to the present time this company has been mining 4- and 5-ft. coal, but a few days ago a big coal bed, the largest ever discovered in the Virginia fields, was found. This measure has not been prospected, and it is not known whether it is merely a pocket or otherwise.

Development was begun recently in a coal mine within a mile of this city with prospects of a 3- to 4-ft. seam. The seam at the outcrop started at 10 in. and at 20 ft. from the point of entry had increased in thickness to 26 in., while it is believed that the seam will increase in thickness to 3 or 4 ft.

## KENTUCKY

**Whitesburg**—The Louisville & Nashville recently lifted its embargo on coal cars going north of Cincinnati, and as a result there has been a considerable revival in coal mining activities throughout the Elkhorn and Boone's Fork fields. The most of the operating companies are said to be swamped with orders. The next few months, it is expected, will be the most prosperous for coal-mining men this section has ever known.

**Middlesboro**—Fire on Feb. 16, destroyed the washer and tipple of the Hignite Coal Co. at a loss estimated to be $30,000, throwing 300 men out of work and stopping operations. Crews were immediately put at work constructing a temporary tipple which will enable the company to produce 600 tons a day and serve until permanent replacements can be made.

**Barbourville**—The Camp Mining Co., owned by Knoxville, Tenn., interests and operating in the Ely Hollow section of Knox County, has gone into the hands of a receiver. J. T. Bradley, of Barbourville, general manager of the Trosper and Paige-Jellico companies, has been made receiver and will continue operations of the plant without change for the present.

## OHIO

**Akron**—The Hine farm, near the city limits of Akron, Ohio, is said to have a considerable quantity of coal upon it, and a 5-ft. bed has been located within a few feet of the surface. The property was purchased some time ago at $375 an acre, and plans are under way for the development of the coal if it is found to be of sufficient value.

**Bellaire**—The Purseglove-Mayer Coal Co. will shortly open a new mine at Willow Grove, north of Neffs, as soon as the weather is favorable. This mine will be up to date in every respect. A tipple and 100 houses for the employees will be erected.

## INDIANA

**Bruceville**—The seals on the Oliphant-Johnson Coal Co.'s mine were broken on Feb. 13, by Government Inspector E. H. Smith of the Bureau of Mines, who has given the company permission to again operate the mine. The mine when opened was found to be still on fire from the explosion on Christmas day. It was sealed after several efforts had been made to extinguish the fire. The mine officials say it will be two weeks before the property will be in operation, on account of necessary repairs and the fact that the entries have been closed by falling coal and timbers. The section containing the fire has been sealed off and the remainder of the mine is being cleaned up preparatory to resuming operations. It is expected that by the time work is resumed the fire will have been completely extinguished. The underground workings have been thoroughly explored by rescue teams from the United States rescue station, at Harrisburg, Ill.

## ILLINOIS

**Benton**—Preparations are under way to sink a long talked of mine at Emmerson, in the northwest corner of Franklin County. The company has 30,000 acres of coal land.

**Duquoin**—Culm banks, which for 20 to 30 years have marked the workings of abandoned mines throughout this section, are now being dug into and thousands of tons of screenings loaded out for the St. Louis and Chicago markets. Twenty-five or 30 years ago screenings were of no value, and several hundred thousand tons were scattered over the fields near the mines. This is being recovered, and prices ranging from $1.50 to $2.50 at the mine are being obtained. The material in most places averages 9000 B.t.u.'s, whereas the fresh coal runs from 10,500 to 11,000.

**Springfield**—Gov. Lowden's consolidation bill, abolishing more than 100 boards, commissions and departments and reorganizating them into nine departments has passed the lower house by practically a unanimous vote. It will not be opposed in the senate. The Department of Mines and Minerals includes the State Mining Board, the State Mine Inspectors, the Miners' Examining Commission, the Mine Fire Fighting and Rescue Station and Commission. It will have power to inquire into mine accidents, the conditions in and equipment of mines, the prevailing economic conditions and the technical efficiency of persons working in and about mines. For the purpose of improving conditions it may provide bulletins, traveling libraries, lectures, correspondence work and classes for systematic instruction. The Department is to be under the direction of a Superintendent of Safety and three miners' examining commissioners.

## KANSAS

**Frontenac**—The Jackson Walker Coal and Mining Co. has recently started production at its No. 16 mine, near Frontenac, Kan. The capacity is 500 tons a day. It will start its No. 17 mine with a production of 1000 tons a day, when the weather opens. The company will then have 5000 tons a day production, and is aiming at 6000 a day, with other developments to follow on its properties.

### COLORADO

**Denver**—A coal mining bill has been recently introduced into the Colorado State Senate by George Hetherington, of Gunnison, submitting to the people a constitutional amendment giving the state the right to mine coal on state lands. The introduction of this bill has been induced by the facts that coal appears to be unnecessarily high in price in this state where production can easily far exceed demand, and that coal-bearing school lands are leased to private companies at extremely low rates, according to the backers of the Hetherington bill.

## Foreign News

**Calgary, Alta.**—At the postponed annual meeting of the Western Coal Operators' Association, held at Calgary, Alberta, Canada, on Feb. 9, W. R. Wilson, of Fernie, B. C., general manager for the Crow's Nest Pass Coal Co., was elected president; O. E. S. Whiteside, of Coleman, Alberta, general manager for the International Coal and Coke Co., vice-president, and W. F. McNeill, of Calgary, secretary-treasurer (reëlected). The association includes all the larger coal-mine operators in Alberta, and the neighboring Crowsnest district of British Columbia.

## Personals

**J. Howard Magee,** who was recently appointed Philadelphia manager of the Knickerbocker Fuel Co., has taken charge of the company's offices in the Pennsylvania Building.

**J. R. Lockard,** of Cumberland, Vancouver Island, B. C., has resigned as general manager for the Canadian Collieries (Dunsmuir) Limited, operating the Comox and Extension collieries on Vancouver Island.

**William Donaldson** of Dubois, Penn., one of the auditors of the United Mine Workers of America, has announced himself a candidate for the office of National Board Member recently made vacant by the resignation of Thomas Hagerty.

**Charles Graham,** for several years superintendent of the Corbin Coal and Coke Co.'s colliery in Southeastern Kootenay, British Columbia, has been appointed superintendent of the Crow's Nest Pass Coal Co.'s colliery at Michel, in the same district, in succession to Thomas Russell, retired by reason of continued ill-health. E. L. Warburton, of the Diamond Vale coal mine, in Nicola Valley, B. C., has succeeded Mr. Graham at Corbin.

## Obituary

**Hon. Ralph Smith,** finance minister of British Columbia, died suddenly a short time ago at Victoria, B. C., at the age of 55 years. He was born at Newcastle-on-Tyne, England, and worked as a coal miner during his earlier life. He came to British Columbia when 34 years of age and became prominent as a trade union leader. He was chosen official agent of the miners of Nanaimo district whom he represented in the Provincial Legislature. In 1900 he was elected to the Canadian parliament as a labor representative, where he became affilliated with the Liberal party—a step which was regarded by many as a betrayal of the labor interest. Mr. Smith subsequently was reëlected to the British Columbia Legislature on the Liberal ticket and became Finance Minister last fall. Mr. Smith was a keen student of political economy and a man of much force of character. He leaves a large family.

## Industrial News

**Fleming, Ky.**—The Elk Horn Coal Corporation will build at least 50 new miners' houses in Hemphill this year in order to increase operations.

**Brookville, Penn.**—In order to supply in-creased tonnage on its line with cars the Pittsburgh & Shawmut R.R. has purchased 250 steel hoppers. Several new mines have been opened between Brookville and Kittaning in the past year.

**Ligonier, Penn.**—A new high price for coal land was established in this locality when A. L. Clifford recently sold 20 acres to the Ramsey Coal Co. for $25,000 or $1250 per acre. The Clifford coal adjoins the present holdings being worked by the Ramsey company.

**St. Louis, Mo.**—The Mid-Nation Iron Products Co., incorporated a few days ago with a capital stock of $2,000,000, plans the construction of an iron furnace in St. Louis. Title has been obtained to 25,000 acres of ore lands in Wayne and Butler Counties, Mo.

**Charleston, W. Va.**—Members of the several coal operators' associations in southern West Virginia have been summoned to appear before a special committee from the Department of Justice at New York, in connection with an inquiry into the high prices and scarcity of coal.

**Toronto, Can.**—Canadian S K F Co., Limited, has been organized under Dominion charter for the manufacture and sale of S K F self-aligning ball bearings in Canada. All correspondence should be directed to Toronto in which city headquarters have been established at 47 King Street, West.

**Marion, Ohio**—Wagons operated by the city recently hauled coal from the Erie yards in West Marion to residents left without fuel when local dealers ran short. Mayor Andrew Sautter, who directed the work, said there was plenty of coal in the yards but a tieup in transfer has prevented dealers unloading the cars.

**London, England**—The Board of Trade, it has been announced, will take possession of the coal mines throughout the kingdom for the duration of the War. It will create a new department for the administration of the mines headed by Guy Calchrop, now general manager of the London & Northwestern Ry., as controller.

**Hillsboro, Ill.**—The Springfield-Carbondale Electric Railway Co. has been incorporated with a capital of $100,000 by D. P. Roberts of Chicago and others. The route as planned is from Springfield through Pawnee, Harvell, Raymond, Butler and Hillsboro and ultimately to Carbondale, in the heart of the southern Illinois coal field. It will be for freight and passengers.

**Benton, Ill.**—An idea of the rapid increase in wealth of Franklin County—the greatest coal-producing county in Illinois—is evident from the tax books for 1917. The total tax is $494,-358.87. This is $118,432.29 greater than last year. In 1902, when the coal industry was rather speculative, the entire taxes of the county was $72,934.95.

**Youngstown, Ohio.**—Plans for the improvement of the Mahoning River to its mouth, so as to make it possible to move coal to Youngstown from the Ohio by that medium for the benefit of the large steel and other industries of the city, have been prepared, and will be presented to the Federal Government at once. The Mahoning and the Beaver have both been declared navigable streams.

**Columbus, Ohio**—The state administration so far has failed to name a successor to James H. Pritchard, chief deputy and safety commissioner of the mining department, who resigned several weeks ago to take effect Feb. 1. Mr. Pritchard is still holding the position although he has been appointed commissioner of the Southern Ohio Coal Exchange to look after compensation and labor matters.

**Indiana, Penn.**—A large coal deal was recorded here recently when the Savings and Trust Co. sold for the Engle estate over 1000 acres in the Two Lick and Yellow Creek district near here, to Robert E. Young and J. R. Daugherty of Indiana; C. M. Lingle of Graceton and B. M. Clark of Punxsutawney. The consideration was $45,000. No plans have as yet been announced for the development of the tract.

**Risco, Ala.**—The Roberts & Schafer Co., Chicago, has recently concluded a large contract in the amount of approximately $200,000 with the Republic Iron and Steel Co., Birmingham, for the designing and building of a reinforced-concrete and steel fireproof coal-washing plant and coal tipple for immediate installation at Risco, Ala. The tipple will have a capacity of 250 tons per hour and the coal washery 150 tons per hour.

**Washington, Penn.**—The Midvale Steel Co. which recently purchased the Marianna workings of the former Pittsburgh-Buffalo Co., also purchased 116 acres of coal land from the Henry Bigler heirs in West Bethlehem Township paying $350 per acre. A tract of 124 acres in Independence Township owned by the Brown heirs was sold to the Duquesne Coal and Coke Co., of Pittsburgh. The consideration in this latter case was $20,500.

**Owensboro, Ky.**—The Appalachian Coal Co., with capital stock of $50,000, has been formed and takes over the property of the Fern Hills Coal Co., recently sold to Charles H. Brady. Incorporators are Oscar W. Black, Corbin, Ky.; Adrian M. Rea, New Bern, N. C., and Owen A. Black and J. Allen Dean, Owensboro. The company will make improvements at the mine at a cost of $10,000 and is to obtain electric current from the Owensboro City Railroad Co.

**Elkins, W. Va.**—The City of Elkins will be the headquarters of the West Virginia Coal and Coke Co., which has been formed and chartered to carry out the scheme of reorganization of the properties of the late Senator Henry G. Davis, according to a statement by Judge Ira E. Robinson, who obtained the certificate of incorporation from the Secretary of State. The company is capitalized at $14,500,000 and over $7000 was paid for issuing the charter.

**St. Louis, Mo.**—The Idaho Southern R.R. which runs from Gooding to Jerome, Idaho and the Milner & North Side R.R., a short line extending from Milner to Oakley, Idaho, comprising a total of approximately 50 miles, have been purchased by the Walter A. Zelnicker Supply Co. of St. Louis, Mo. These railroads were built only a few years ago by Pittsburgh capital. It is understood the Walter A. Zelnicker Supply Co. will dismantle the roads and sell the rails and other equipment, which are practically new.

**Fairmont, W. Va.**—The Bethlehem Coal Co., which has been incorporated here with J. E. Watson as president, will develop a large acreage on the Western Maryland R.R., the property having been recently purchased. The organization of the company marks the reëntry of Mr. Watson into active operating work. Other officers of the company are: Harry H. Watson, vice-president; Marshall E. Ashcraft, secretary; George E. Peddicord, general manager; J. E. Watson, Jr., treasurer, and W. C. Hanlon, chief engineer.

**Charleston, W. Va.**—A big coal deal resulting in the sale of the Piney Collieries Co. to the Milwaukee Coal and Gas Co. for $2,000,000 was recently consummated. The coal land sold to the Milwaukee Coke and Gas Co. is on the Piney Branch of the Chesapeake & Ohio R.R., and embraces more than 4400 acres. The purchaser has recently become interested in West Virginia coal properties, and some time ago bought the Elkhorn & Piney Coal Mining Co., and more recently is supposed to have taken over properties in the Kanawha field at St. Clair.

**Philadelphia, Penn.**—The Hess-Bright Manufacturing Co. has opened two branch sales offices—one for the eastern portion of the country at 1974 Broadway, New York, and one for the central section at 1036 Guardian Building, Cleveland, Ohio. H. E. Brunner is in charge of the New York Office and is assisted by H. A. Fonda. The Cleveland Office is under the direction of R. E. Clingan, assisted by Walter Rippien and M. S. McNay. These offices are opened with the intention of giving more prompt and thorough attention to the ball bearing requirements of the trade, both as to engineering and sales, than has heretofore been possible.

**St. Louis, Mo.**—A careful survey of the cost sheets of several Illinois operators in the Williamson and Franklin County field has disclosed the fact that where mine-run formerly cost about $1 to $1.10 the cost of production today ranges from $1.40 to $1.50. This is largely on account of errors in the past in accurately figuring the cost of production, but the principal cause is the increase in the cost of supplies, together with the increased number of idle days per month through which the overhead continues. Further investigation develops that everything with the exception of one that enters into the production and selling cost has increased. In but very few instances has there been any increase paid to the selling force. This is the one item that shows no increased cost.

**Harrisburg, Penn.**—The Pennsylvania R.R.'s proposed regulation to refuse to deliver coal cars to operators or shippers not having tipples at mines, to be effective on Mar. 17, after 30 days' notice, was attacked on Feb. 16, by Cambria County coal shippers before the Public Service Commission. The railroad some time ago proposed to put into effect a regulation—on three days' notice—refusing cars to operators who load from wagons and do not have tipples, on the ground that the car shortage made it necessary, but the commission refused to approve it after a series of hearings. The company now has given notice of intention to make such a regulation effective on 30 days' notice. The coal operators who load from wagons, who are numerous in the soft-coal region attack the regulation as discriminatory.

**Columbus, Ohio**—The Ohio Collieries Co., of Toledo has been incorporated under the laws of Ohio with a capital of $2,000,000 to take over and operate the mining properties formerly comprising the Continental Coal Co. Confirmation of the sale of the properties to George M. Jones was given by the courts, and all of the legal complications have now been surmounted. The properties include mines in Athens, Perry and Hocking Counties, which were formerly under lease to the Sunday Creek Coal Co. The court took under advisement the motion for the appointment of a trustee for certain first mortgage bonds of the Kanawha & Hocking Coal and Coke Co. The incorporators are: Newton A. Tracey, Norman W. Reed, Thomas W. Hughes, Fred G. Zink and Charles Weirich. The sales office of the concern will continue at Columbus.

**Norfolk, Va.**—Extensive additions to the coal pier at Sewalls Point will be made this year by the Virginian Railway Co. An appropriation of $750,000 has already been authorized for this purpose and the work will begin early in the summer. The building of additions to the company's pier here is one of the big improvements necessary to meet the steadily increasing business. The increase of $10,000,000 in the capital stock of the company, as authorized at the annual meeting of the stockholders will be used in part for the enlargement of the pier and the purchase of additional rolling stock. It was stated at the offices of the President of the Virginian that $3,000,000 will be spent for engines, coal cars and passenger equipment. It was said that orders for this additional equipment have already been placed and include 10 of the largest Mallett engines in the world.

# Market Department

## GENERAL REVIEW

**Anthracite reserves wiped out and trade dependent on current shipments which are slow. Traffic congestion forcing suspension at industrial plants due to inadequate fuel shipments. City Governments taking over coal distribution at some points. Middle West bordering on the verge of a panic market.**

**Anthracite**—The return of milder weather has once more saved the anthracite trade from a severe panic just at the crucial stage. As it is, consumers have been so thoroughly alarmed that there is a very urgent demand for every ton of coal available with the result that what little reserves there were have been wiped out, and the trade is dependent entirely on current shipments. The approach of customary discount period finds the price situation very erratic with quotations on the various grades frequently entirely out of proportion. The trade is anxiously awaiting some announcement as to the new prices, and there is now a rumor that no discount will be made Apr. 1, and that 5c. per month will be added as usual, which, besides giving the companies a substantial extra profit through the summer period, will mean a flat advance in price of 25c. per ton. In the meantime, buyers are very much on the initiative, and the most urgent appeals are being made for coal. Many jobbers are receiving no shipments at all, while coal is frequently two weeks or more in reaching destination.

**Bituminous**—Shortage of coal in all directions continues the dominating note in the trade. The difficulty is still due to the tremendous railroad congestion which has resulted in the worst demoralization in traffic for years. Not only is the car supply very poor in the mining regions, but deliveries are also falling away behind normal schedules. As a result mining interests are exceedingly hard pressed to keep industrial plants running, and frequently have to manoeuver their inadequate tonnages to accomplish this. The Government is already taking very heavy shipments, and with the possibility of calling for still larger supplies at any time, the agencies are naturally very cautious. Shippers are obviously laboring under the constant fear of overselling their capacity, or rather the capacity of the railroads to ship. Prices have advanced in a spectacular manner in some instances, and more investigations by state and city officials are being made. The situation is particularly serious because the constantly recurring shortages have exhausted considerable reserve stocks which more conservative companies have always carried.

**Ohio Valley**—The warmer weather has relieved the railroad congestion sufficiently to get through enough coal to avoid a suspension at a great many industrial plants, but the market has been through the most crucial stage of the winter. It has only been by the closest coöperation between the producing, transportation and distributing interests that famine conditions have been avoided at most points. Even as it is, there has been considerable confiscation of coal while very drastic action has been taken in some cases, and threatened in a great many others. Dealers in many sections have been cleaned out entirely, while others have been reducing their allotments, even to the most favored customers. Conditions in Canada have been especially acute, Toronto University having been closed, and the city governments in several instances having taken over the problem of coal distribution. In view of the very unsettled conditions, accompanied by spectacular prices, negotiations on new contracts have been generally suspended although there is a more marked tendency on the part of the consuming interests to take the initiative.

**Middle West**—One of the worst transportation congestions in the history of this section has completely demoralized the coal industry, and a runaway market was prevented only by a sudden return of milder weather. Conditions have reached such an acute stage at times that state officials have threatened to take drastic action. The car shortage is now a less important factor than the tremendous congestion at the distributing centers, which has made it almost impossible to effect deliveries. At the upper Lake docks the supplies have become so reduced that measures are being taken to establish a reserve for the railroad requirements. The shortage in that section is reported the worst in 16 years. The situation in Indiana became so acute that coal has been given the preference over all other freight until Mar. 1.

**A Year Ago**—Anthracite slightly easier. Bituminous hinging largely on weather and results of labor conferences. Indications point to higher prices on contracts. Exports lighter. Demand at interior points confined mostly to contracts. Middle West trade continues strong.

## Comparative Average Coal Prices

The following table gives the range of mine prices in car lots per gross ton (except where otherwise noted) on 12 representative bituminous coals over the past several weeks and the average price of the whole group for each week:

| Boston | Year Ago | Feb. 24 | Feb. 17 | Feb. 10 | Feb. 3 | Jan. 27 |
|---|---|---|---|---|---|---|
| Clearfields | †$1.75@2.40 | $5.15@6.00 | $4.85@5.50 | $4.60@5.15 | $4.50@4.25 | $4.75@5.60 |
| Cambrias and Somersets | †1.90@2.65 | 5.50@6.25 | 5.00@5.75 | 4.85@5.50 | 4.90@5.50 | 5.00@6.25 |
| Pocah. and New River[1] | 2.80@2.90 | 7.00@7.25 | 6.75@7.00 | 6.50@6.75 | 6.50@6.75 | 6.50@7.00 |
| Philadelphia | | | | | | |
| Georges Creek (Big Vein) | *2.75@3.00 | 5.75@6.00 | 5.50@5.75 | 5.75@6.00 | 5.75@6.00 | 6.00@6.25 |
| W. Va. Freeport | *1.50@1.60 | 4.75@5.00 | 4.00@4.50 | 5.00@5.15 | 5.00@5.15 | 5.00@5.25 |
| Fairmont Gas mine-run | *1.65@1.75 | 5.25@5.50 | 5.00@5.25 | 5.25@5.50 | 5.25@5.50 | 5.25@5.50 |
| Pittsburgh (steam coal)[2] | | | | | | |
| Mine-run | *1.25@1.30 | 5.25@5.50 | 5.25@5.50 | 4.95@5.05 | 4.70@4.80 | 4.50@4.75 |
| ¾-in. | *1.35@1.40 | 5.25@5.50 | 5.25@5.50 | 4.95@5.05 | 4.70@4.80 | 4.50@4.75 |
| Slack | *1.15@1.20 | 5.00@5.25 | 5.00@5.25 | 4.70@4.80 | 4.40@4.60 | 4.00@4.00 |
| Chicago (Williamson and Franklin Co.)[2] | | | | | | |
| Lump | *1.60@1.75 | 3.75@4.00 | 3.50@3.75 | 3.75@4.00 | 3.75@4.00 | 3.75@4.00 |
| Mine-run | †1.10@1.20 | 3.50@3.75 | 3.00@3.50 | 3.00@3.25 | 3.25@3.50 | 3.25@3.50 |
| Screenings | * .90@1.00 | 3.25@3.50 | 3.00@3.25 | 3.00@3.25 | 3.25@3.50 | 3.25@3.50 |
| Gross average[3] | *$1.64@1.84 | $4.95@5.29 | $4.67@5.04 | $4.70@4.95 | $4.66@4.86 | $4.64@5.03 |

[1] F.o.b. Norfolk and Newport News. [2] Per net ton. [3] The highest average price made last year was $4.80@5.33 made on Nov. 25.
* Price lower than the week before. † Price higher than the previous week.

## BUSINESS OPINIONS

**Dun**—Restraints on business are intensified, and the industries seriously hampered at a time when unchecked operations are essential to meet pressing requirements. Production in many instances is halted by the transportation congestion, which is aggravated by storms and low temperatures, and the delayed freight movements accentuate the paucity of supplies and further strengthen prices of some raw materials and products. With deliveries more uncertain and government wants becoming a factor, some buyers who previously held off are now anxious to place contracts for the future, though many manufacturers are not disposed to enter into forward negotiations under present conditions and distributing interests advise caution in purchasing. Commercial failures this week are 276, against 296 last week, 325 the preceding week and 428 the corresponding week last year.

**Bradstreet**—Despite many drawbacks, chief of these being partially blockaded foreign trade, unprecedented railway congestion, threatening public food and fuel supplies, and very cold, stormy weather, the country's trade continues large—heavier than a year ago at this date, in fact. This is, of course, especially true of spring trade, which is secure beyond peradventure, except where delays in shipping threaten to further retard deliveries of urgently required goods. Retail trade, save where given a spur by the coldest weather of the winter, is rather less active, though concededly better than a year ago.

**Dry Goods Economist**—Judging by the attitude of those who have been in New York this week, in attendance at conventions and for other purposes, merchants throughout the country are paying little heed to the ominous conditions created by our relations with the German government. This is remarkable in view of the probable effect on the prices and supply of certain lines of goods, to say nothing of the possibilities from a still broader standpoint.

**Marshall Field & Co.**—Wholesale distribution of dry goods for the current week is running about even with the corresponding period of a year ago. Road sales for immediate and spring delivery are a little behind those of a year ago, while road sales for future shipment are considerably ahead of last year. Customers have been in to market in larger numbers. Collections are better than in the same week last year. The market on domestic cottons is firm.

## Contract Prices

**Boston**—One distributor inland is closing contracts for the year at $7.50 on cars, an advance of 50c. over contracts closed last month. There are also rumors that the $4.75 base price at Hampton Roads may soon be advanced $1 or so. Georges Creek operators have now definitely announced that they will not have any tonnage to contract in this section.

**Philadelphia**—There has been a strong movement on the part of consumers to get protected on new contracts at ruling prices, while producers are consistently refusing to obligate themselves for any extensive tonnages. The chief anthracite steam size, white ash buckwheat, is well fixed at $2.50.

**New York**—A contract involving 3600 tons has been closed at $5.70 as compared with $4.20 on the expiring contract.

**Buffalo**—Shippers have withdrawn their prices from the contract market generally. They are unable to get quotations from the mines and do not feel safe in making them independently. Consumers are anxious to go on, but are not willing to meet the big prices necessary to insure contracts.

**Columbus**—Little attention is being given to contracting for steam tonnage because of the abnormal conditions that prevail. Producers and jobbers have received quite a number of inquiries for prices on steam tonnage.

**Cincinnati**—A few contracts have been closed at $3 per short ton for mine-run, and nut and slack f.o.b. mine. Consumers are taking the initiative in negotiations, and producers are backward about committing themselves.

**Chicago**—It is understood that southern Illinois operators are refusing $1.65 on screening contracts for the year from Apr. 1, which compares with $1.60 on a 10,000-ton contract for 2-in. screenings noted in our issue of Feb. 10, and with 85c. per ton at this time last year. Railroads are making tentative offers of 50c. per ton above their old contracts. Operators are even more reluctant to contract because of the recent exceptionally strong spot market.

**St. Louis**—Contracts have been closed for Standard 2-in. lump at prices ranging from $1.32½ to $1.60. The low price, which is an increase of 25c. per ton over old contracts, was made by a short-line railroad whose equipment is restricted to St. Louis switching limits, and the high price was made on a trunk line road. Contract figures in the high-grade field are: Screenings, $1.85 to $2; mine-run, $2 minimum; lump, $2.25. These figures do not consider dealers' or apartment house business.

## Atlantic Seaboard

### BOSTON

**Higher prices in prospect for near future. Very little spot coal at Hampton Roads and agencies decline to quote for delivery more than a fortnight ahead. Pennsylvania grades also advance materially. Anthracite receipts extremely light.**

**Bituminous**—There are present today all the makings of another "flurry" in spot prices. The extremely cold weather has seriously interfered with mining and with the movement of cars. Hard conditions along the coast and the difficulty of getting cargoes from Philadelphia and Baltimore together with greater consumption on account of the low temperatures have also accelerated the demand. Consumers and distributors alike find that February requirements are very much in excess of estimates and actual

receipts. Factors here who had no intention of entering the market before Apr. 1, are now forced to pick up coal where they can.

Spot quotations are therefore much firmer than a week ago, and there are fewer shippers in position to sell. Those who offered coal for dumping around Feb. 15, find car supply will not permit loading at the mines until nearly the last of the month. Meanwhile, dispatch at the piers is in a fair way to be a week rather than the three days that have lately been the rule. Owners or those who have ships under charter find it increasingly difficult to arrange for loading. Frequently eight or nine different agencies are being called upon to coöperate in furnishing cargoes. Bottoms are shifted from one pier to another and sometimes from Norfolk to Newport News in order to get them clear in something like reasonable time.

Every shipper is watching over his coal and manoeuvering to make each thousand tons go as far as possible. All interests are as close-hauled as ever on commitments for the future. With the Government likely to drop on them any day for heavy supplies it cannot be wondered at that the agencies are cautious.

Meanwhile another of the distributors inland from Boston is reported to have made sales for a twelve months' period at $7.50 on cars, or 50c. more than contracts were closed at a month ago. The volume of coal sold recently is understood to be relatively light and confined to customers who have drawn their supply from the same source the current year. There are intimations that the $4.75 basis f.o.b. Hampton Roads for contract may soon be advanced a dollar or so.

The principal shippers of Georges Creek have now made plain their unfavorable attitude toward 1917 contracts. None are to be made, at least in this territory or on coastwise business. Whether the arrears on 1916 contracts are to be adjusted remains to be seen.

The Pennsylvania grades have stiffened materially this week. Embargoes against certain of the Tidewater terminals have served to restrict the volume of spot coal, and movement all-rail has again become slow and undependable. The great dread on the part of operators is of overselling, and yet there is always coal forthcoming at the top of the market.

Several prominent interests that usually figure in this territory are scarcely heard from, to such large extent has output been placed in sections nearer the mines and less subject to eccentricities of car supply. The Pittsburgh market is now so insistent for all grades of Pennsylvanias, that spot prices have been bid up 50c. or so in the course of a few days.

The practical embargo of water shipments from Philadelphia on account of ice conditions in the Delaware has brought home to New England retailers how close to the wind they have been sailing. Stocks are light, and the consumer or large dealer who has a month's supply on hand is very much the exception.

Bituminous at wholesale is quoted about as follows, f.o.b. loading ports at points designated, per gross ton:

| | Clearfields | Camb. and Somerset |
|---|---|---|
| Philadelphia | $6.30@7.25 | $6.50@7.50 |
| New York | 6.40@7 35 | 6.65@7.60 |
| F.o.b. mines | 5.15@6.00 | 5.50@6.25 |
| Alongside Boston (water coal) | 8.75@9.50 | 9.00@9.75 |

Pocahontas and New River are quoted at $7@7,25 f.o.b. Norfolk and Newport News, Va., for spot coal, and $10.50@11.25 on cars Boston and Providence for inland delivery. One lighter load of Clearfield was sold at $10.50 alongside.

**Anthracite**—This market now leans so heavily upon water delivery from Philadelphia that the interruption in shipments from that point is most disappointing. Dealers who have managed to keep in stock from one source or another are now confessing their inability to get coal. The recent cold spell was the worst and most protracted since 1904. Large sections of Boston Harbor have been mantled with 8 in. of ice. Several coal wharves have been inaccessible by water and barges and lighters have been frozen in to greater extent than would have been thought possible.

All the domestic sizes are in short supply, and independent shippers are apparently in no better position to get cargoes afloat than are the shippers who have normally looked after this market. The New York companies are sending very little here.

## NEW YORK

**Good demand for hard coals. Steam sizes quoted high and shortage forces consumers to use larger grades. Some middlemen not offering buckwheat sizes. Bituminous stocks larger with a brisk demand. Supplies at industrial plants low and consumers anxious.**

**Anthracite**—A continuation of low temperatures with poor car supply and frequent interruptions at the mines, has diminished the supply at the New York Tidewater to a minimum. There was a comparatively small lot of coal on hand the first of the week and wholesale dealers and shippers were frequently appealed to for quick shipments. Stocks in several near-by inland towns, not dependent upon Tidewater shipments, were also low.

The bulk of the demand continues to center on the hard steam coals. Buckwheat No. 1 is in heaviest demand and there are reports of certain large consumers in Manhattan offering as high as $10 per ton. Rice coal is almost as scarce and while some middlemen are reporting sales there are others who have none to offer at any price. Some free independent boiler coal is selling at good premiums.

Domestic coals are scarce and the buyer is taking the initiative though the high prices cause delays in placing orders. Yard supplies are low and many of the dealers are doing business from hand to mouth.

Tidewater stocks are about as low as they have been at any time outside of strike periods. Lack of cars and the continued indifference of the miners to work have interfered greatly with production. There have also been frequent labor difficulties.

Current quotations, per gross ton, f.o.b. Tidewater, at the lower ports are as follows:

| | Circular | Individual |
|---|---|---|
| Broken | $4.95 | |
| Egg | 5.45 | $8.25@8.50 |
| Stove | 5.70 | 8.25@8.50 |
| Nut | 5.75 | 8.25@8.50 |
| Pea | 4.00 | 7.25@7.50 |
| Buck | 2.75 | 7.00@7.25 |
| Rice | 2.20 | 5.00@5.50 |
| Barley | 1.95 | 4.00@4.25 |
| Boiler | 2.20 | 3.50@4.00 |

Quotations at the upper ports are generally 5c. higher on account of the difference in water freight rates.

**Bituminous**—There has been some improvement in soft coal conditions. On Monday the car supply was reported as the best of any day this month and a continuation of this will tend to soften the market. In addition there was more spot coal to be had than in several days.

Prices were firm, however, and buyers looking for coal at low prices were disappointed. Loaded boats were in good demand and quotations were as much as $1 higher than for the same coals at the piers. Quotations have fluctuated considerably, one sale reported early in the week at $7 being followed in less than half hour by an increase of 50c. Supplies have been short for so long a time that many industrial plants have nearly emptied their bins and are in danger of being shut down.

Bunker demand is increasing, many ships now leaving the harbor in spite of war threats. Although the export situation is quiet some of the wholesale houses received inquiries during the week for quotations on 15,000 tons for Norway.

Current quotations, per gross ton, f.o.b. Tidewater, for various grades are as follows:

| | Port Reading | South Amboy | Mine Price |
|---|---|---|---|
| George Crk. Big Vein | $7.75@8.00 | $7.75@8.00 | $6.00@6.50 |
| Tyson | 7.50@7.75 | 7.50@7.75 | 5.75@6.25 |
| Clearfield | 7.25@7.50 | 7.25@7.50 | 5.00@5.25 |
| South Frk | 7.50@7.75 | 7.50@7.75 | 5.75@6.25 |
| Nanty Glo | 7.50@7.75 | 7.50@7.75 | 5.75@6.25 |
| Som'r. Co | 7.25@7.50 | 7.25@7.50 | 5.00@5.25 |
| Que'ho'ing | 7.50@7.75 | 7.50@7.75 | 5.75@6.25 |
| W. V. Fa'rm't Th'r'qua | 7.00@7.25 | 7.00@7.25 | 5.00@5.35 |
| Mine-run | 7.00@7.25 | 7.00@7.25 | 5.00@5.35 |
| West. Md. | 7.25@7.50 | 7.25@7.50 | 5.00@5.25 |

Export shipments from the Port of New York during January of this year were 7934 tons of anthracite, valued at $65,068; 2049 tons of bituminous, valued at $9246, and 1660 tons of coke, valued at $10,902. In January of last year the exportations were 8912 tons of anthracite, valued at $48,477; 893 tons of bituminous coal, valued at $3408, and 136 tons of coke, valued at $1097.

## PHILADELPHIA

**Anthracite situation fails to improve. Premium business mildly active. Pea the shortest size and there are rumors of a new price on this grade. Railroad congestion cuts down production. Heavy demand for steam coal. Bituminous moves upward. Very poor car supply cuts tonnage.**

**Anthracite**—Dealers have very little coal on hand, and all receipts are immediately disposed of to the most needy customers. It has been dangerously near a coal famine on several occasions, but each time as the situation becomes most critical the thermometer rises and a panic is averted.

The fact is that but one big company, and none of the individuals, has shipped as much coal to Philadelphia during February as in other years—and they only because of heavy storage stocks and several big washeries just started. Another company whose tonnage here a year ago was very heavy is falling behind this month at least 50%. Their collieries are located in a region that is the hot-bed of unionism and its management has been harassed more than their trade here in its present humor will believe. There has, up to this time, been enough coal to go around, but it has taken strong efforts to keep the public in check.

Local dealers are now freely offering from 50c. to 75c. premium for any size, but as inducements from other markets are greater there has not been a great deal of coal shipped here by the individuals. Several firms report numerous offers of from $6 to $6.25 at the mines for egg, stove and chestnut and $4 for pea. In fact a small tonnage has been shipped here at these figures.

Of the family sizes the big drive is still on pea coal. A great many dealers do not have a single ton of it in stock and no company will accept any new business. When the company which sets the pace in prices recently advanced buckwheat to their regular trade from $1.65 to $2.50, it became apparent that pea coal was due for a substantial increase over the present circular of $2.80. Nothing was needed to stimulate the buying of this size, but now with an abnormal demand and the strong suspicion of an increased rate the shippers are swamped with business.

A peculiar situation has arisen on Lykens Valley coal mined by the big company. The circular price of this buckwheat was $2.50, but like the white ash it was advanced 85c., making the selling price $3.35 or 10c. higher than the same grade of pea coal, on which the circular price was unchanged and still is $3.25. Naturally these prices are due for a revision, but in the interim it is easily assumed that there has been some frenzied buying of Lykens Valley pea coal. The buckwheat of this grade is also hopelessly oversold.

One of the largest shipping companies had its salesmen make a canvass of the yards and estimate the amount of coal each dealer had on hand. At this writing the work has not been completed, but some surprisingly low stocks have been reported. Probably more chestnut is in stock than any other size, but it is far from plentiful and certainly there has been no cessation in the buying.

If anything the railroad congestion grows worse. This week most all the mining companies report the closing down of collieries for a day or so due to the lack of empty cars and when shipments do get started there is no telling when they will arrive.

Steam coal deliveries are far behind the orders and while occasional cars of buckwheat are reported sold at $3.50 a ton here, it is stated that even as much as $5 is being paid in outside markets.

The prices per gross ton f.o.b. cars mines for line shipment and f.o.b. Port Richmond for tide are as follows:

| | Line | Tide | | Line | Tide |
|---|---|---|---|---|---|
| Broken | $4.25 | $5.40 | Buck | $2.50 | $3.40 |
| Egg | 4.15 | 5.25 | Rice | 2.10 | 3.00 |
| Stove | 4.10 | 5.60 | Boiler | 1.95 | 3.15 |
| Nut | 4.50 | 5.55 | Barley | 1.85 | 2.05 |
| Pea | 2.80 | 3.70 | | | |

**Bituminous**—Prices began to move upward recently and increased as much as 75c. a ton in one instance and 50c. in another, but on an average it was about 25c. The upturn came suddenly and it may subside as quickly as it began because of the milder weather and promise of relief by the railroads. The car supply has been a most serious factor lately and some operators report that their allotment has been as small as 5%, although most interests report about 20%. We know of one good-sized operation where the miners have not made living wages for the past two weeks on account of lack of cars. Other shippers report that they are losing their workers entirely on account of them drifting to other regions in search of work. Inquiries for spot coal have become very active recently, but supplies are hard to procure.

The prices per gross ton f.o.b. cars at mines are as follows:

| | |
|---|---|
| Georges Creek Big Vein | $5.75@6.00 |
| South Fork Miller Vein | 5.50@5.75 |
| Clearfield (ordinary) | 5.00@5.25 |
| Somerset (ordinary) | 5.00@5.25 |
| West Va. Freeport | 4.75@5.00 |
| Fairmont gas lump | 5.50@5.75 |
| Fairmont gas, mine-run | 5.25@5.50 |
| Fairmont gas, slack | 4.75@5.00 |
| Fairmont lump, ordinary | 5.25@5.50 |
| Fairmont mine-run | 5.00@5.25 |
| Fairmont slack | 4.75@5.00 |

## BALTIMORE

**With heavy demand for coal and with the most acute car and fuel shortage that has confronted this territory prices for bituminous have jumped. Anthracite supplies short also.**

**Bituminous**—The market is confronted with the worst car supply of the winter, some mining districts being left without empties for days. Deliveries at tide have not averaged more than 30 per cent. of requirements. Prices have kept advancing, and coal here on a mine basis of between $6 and $7 has been the general talk. Mine interests have been hard pressed to care for enough of contract deliveries sufficient to prevent actual shortage to industrial plants. For small emergency lots almost anything was offered at times. Mine interests and shippers importuned

each other for coal with but poor results. A Federal probe is under way in Baltimore to determine the reason of the shortage, and inquiries are being made by local officials in Cumberland, Easton, etc., where fuel shortage has been so acute as to close schools and industrial plants.

A wide range of quotations is noted, but an average is about as follows: Georges Creek Tyson, $7; Quemahoning, $6.50; South Fork, $6 to $6.50; Somerset, $6 to $6.50; Clearfield, $6.50; Freeport, $5.50 to $6; Fairmont gas, three-quarter, $6; same, run-of-mine and slack, $5.50.

**Anthracite**—Hard coal deliveries here are very light. Many coal men have received nothing and some coal shipped more than two weeks ago is just coming in. All deliveries are being doled out, in small lots, and the final yard supplies are being drawn on. The approach of spring is the only salvation to a situation that is too near famine-like to be comfortable.

**Exports**—The second foreign shipment this month was made the past week. One vessel went out with 1286 tons for a foreign port, and 320 tons of bunker coal.

### HAMPTON ROADS

**Congestion of past two weeks now relieved. Dumpings increasing. Information regarding movement of vessels withheld. No change in prices. Contracting at standstill.**

With warmer weather the loading at the various piers has improved and the congestion of the past several weeks has about been cleaned up. The Navy Department continues to take a large tonnage, also the Panama Canal authorities. In addition to the two large Canal colliers, the "Achilles" and "Ulysses" of 13,600 deadweight, the Panama Railroad steamers "Ancon" and "Cristobal" are carrying coal. As will be noticed from the dumpings of the various railroads there does not seem to be any lessening of demand and of course no falling off in prices.

Under instructions from the State Department the greatest secrecy is being observed in regard to movements of vessels in the foreign trade. Steamers are now assigned secret code letters to enable them to pass the net stretched across Hampton Roads.

Contracting is virtually at a standstill, sellers being unwilling to commit themselves for future delivery. Just how long this situation will continue is problematical, as some shippers express themselves as preferring taking their chances at the market for the next twelve months rather than tie up even at the increase over last year.

Prices are at recent quotations, with no stocks on hand, as follows: Pocahontas and New River run-of-mine for cargo shipment coastwise and foreign about $7 per gross ton; bunker coal $7.50 per gross ton plus 15c. per ton trimming; for local track delivery $6.50 per net ton in carload lots, anthracite $9 per net ton delivered. Local dealers report stocks of anthracite as about exhausted.

Dumpings at the Hampton Roads piers for the past several weeks were as follows:

| | Jan. 27 | Feb. 3 | Feb. 10 | Feb. 17 |
|---|---|---|---|---|
| Nor. & West | 138,413 | 84,162 | 106,980 | 114,832 |
| Ches. & Ohio | 81,835 | 103,279 | 44,328 | 130,752 |
| Virginian | 111,799 | 77,154 | 58,083 | 77,158 |
| Total | 332,047 | 264,595 | 209,391 | 322,742 |

## Ocean Shipping

### OCEAN CHARTERS

Coal charters have been reported as follows during the past week:

PHILADELPHIA

| Name | Destination | Tons | Rate |
|---|---|---|---|
| Ordunte | River Plata | 2,435 | $23.40 |

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| | | | |
|---|---|---|---|
| O. C. Curtis | River Plata | 2,000 | 20.00 |
| Afoleo | Rio Grande do Sul | 1,011 | [1]22.50 |

ATLANTIC RANGE

| | | | |
|---|---|---|---|
| Erik II. | Havana | | 4.50 |

BALTIMORE

| | | | |
|---|---|---|---|
| Felix Taussig | Buenos Aires | New | |
| Alderney | Rio Janeiro | 1,970 | |
| Howick Hall | Rio Janeiro | 3,094 | |
| Erik II. | Havana | 2,052 | 4.50 |

[1] March.

### COASTWISE FREIGHTS

While rates from Hampton Roads to Boston are nominally unchanged at $3.25@3.50, there are almost no charters, steamers being about the only transportation available. Even in such cases the present holders consider bottoms worth more to themselves than for charters in the open market. Added to this cargoes are very hard to arrange for.

On Long Island Sound for New York loading rates are up again to $1.35@1.50, depending upon the prospect for loading. Delays of 10 to 12 days are apparently the rule.

### VESSEL CLEARANCES

The following vessels have cleared with coal cargoes during the past week:

NORFOLK

| Vessel | Destination | Tons |
|---|---|---|
| Edward Pierce | San Juan, P. R. | 6,285 |
| Cacique | Iquique, Chile | Note |
| Colomba | Genoa, Italy | Note |
| Ocland | Havana, Cuba | 4,714 |
| Nordamerika | Barbados, B. W. I. | 4,004 |
| Josephine | Para, Brazil | 1,157 |
| Millie R. Bohannon | St. Georges, Bermuda | 849 |
| Tifton | Para, Brazil | 870 |
| Neptune | St. Lucia, B. W. I. | 926 |
| Carib II. | Kingston, Jamaica | 293 |
| Eva B. Douglass | Para, Brazil | 1,571 |
| Plymouth | Buenos Aires, A. R. | 6,261 |

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| | | |
|---|---|---|
| Skogstad | Fort de France, Martinique | 5,552 |
| Stephen R. Jones | Rio de Janeiro, Brazil | 5,985 |
| Nolisement | Dakar, F. W. A. | 7,769 |
| Henry Tegner | Neuvitas, Cuba | 1,996 |
| Nepos | Curacao, D. W. I. | 3,998 |
| Rimfaxe | Havana, Cuba | 1,188 |
| Isabel B. Wiley | Bahia, Brazil | 1,147 |

PHILADELPHIA

| | |
|---|---|
| Josey | Havana |
| Haarde | Havana |
| Rachel W. Stevens | Lisbon |

Note—It is no longer possible to obtain the list of shippers which has always appeared in connection with this table.

### OCEAN FREIGHTS

There was only one reported fixture for export coal since last report, the steamer "Ordunte Mendi" 6500 tons, 10%, February loading, Philadelphia to River Plate at $23.40. The freight market continues strong due to the great scarcity of available tonnage, and it is more than difficult to arrange export coal charters. However, we have a few boats that are willing to talk business.

We would quote freight rates on coal by steamer as follows:

| | Feb. 13 | Feb. 19 |
|---|---|---|
| Europe | | |
| West Coast Italy | $54.00@60.00 | $56.80@62.40 |
| Marseilles | 52.80@57.60 | 54.00@58.80 |
| Barcelona*[2] | 25.20@27.60 | 24.00 about |
| South America | | |
| Montevideo | 22.80@24.00 | 23.40@24.00 |
| Buenos Aires | 22.80@24.00 | 23.40@24.00 |
| Rosario | 25.20@27.60 | 25.20@27.60 |
| Rio Janeiro | [3]19.00 about | [3]19.00 about |
| Santos | [3]20.00 about | [3]20.00 about |
| Chile (good port) | 13.00@16.00 | 14.00@16.00 |
| West Indies | | |
| Havana | 4.50 about | 4.75 about |
| Cardenas, Sagua | 6.50 about | 6.50 about |
| Cienfuegos | 6.50@6.75 | 6.50@6.75 |
| Port au Spain | 10.00 about | 10.00 about |
| St. Lucia | 10.00 about | 10.00 about |
| St. Thomas | 8.00@9.00 | 8.00@9.00 |
| Barbados | 10.00 about | 10.00 about |
| Kingston | 7.50 about | 7.50 about |
| Curacao[1] | 8.00@8.50 | 8.00@8.50 |
| Santiago | 6.75 about | 6.75 about |
| Guantanamo | 6.75 about | 6.75 about |
| Bermuda | 7.00 about | 7.00@8.00 |
| Mexico | | |
| Vera Cruz | 8.50@9.00 | 8.50@9.00 |
| Tampico | 8.50@9.00 | 8.50@9.00 |

* Spanish dues for account of cargo. [1] And p.c.
[2] Or other good Spanish port. [3] Net.

Note—Charters for Italy, France and Spain read: "Lay days to commence on steamer's arrival at or off port of discharge."

W. W. Battie & Co.'s Coal Trade Freight Report.

## Ohio Valley

### PITTSBURGH

**Traffic conditions worse, but weather just turned more favorable. Spot gas coal higher. Contracting light.**

The coal market has gotten into still more chaotic condition. For a week coal shipments have been at a rate still further reduced while demand has banked up and at the same time coal en route has been further delayed while the pressure of embargoes is heightened. Thus the demand at mine is less than the demand at consuming points and yet the demand at mine is the heaviest thus far. Last week the weather moderated, producing some hope in the minds of buyers that a delay of a few days in purchasing might prove quite advantageous. Thus far, however, the market has not softened, being as strong as a week ago on steam coal and still higher on gas coal.

According to all accounts contracting has practically ceased. The early contracts made, as already reported, at prices up to $3 and sometimes a trifle higher, have evidently not set the pace for the entire market, but it is possible the sellers have had as much to do with the smallness of the volume of business done as the buyers have had, sellers in present circumstances seeing no definite prospect that after Apr. 1 they will be able to ship as much as 50% of their coal mining capacity. It is generally accepted now that the condition on the railroads is not merely one of congestion, but is chiefly one of lack of motive power, engines having gotten into poorer shape during the winter, whereby when mild spring weather arrives their performance will not be as good as it was in the same temperature last October, and there were very serious car shortages even then.

We quote the market approximately as follows: Spot: Slack, $5@5.25; steam mine-run, $5.25@5.50; ¾-in. gas, $6@6.50; contract, steam, $3@3.25; gas, $3.25@3.50, per net ton at mine, Pittsburgh district.

### BUFFALO

**Market slowly recovering from almost famine conditions. Last big blizzard about shut off all coal. Situation much easier now.**

**Bituminous**—The failure of the usual weekly blizzard, to appear in any force, has improved conditions and there are some distinctive prices given out, though everything is higher and will remain so till the railroads are in normal running condition.

Shippers and consumers were holding joint meetings almost all through last week for the purpose of devising means of getting hold of the coal that was snowed in all along the rail lines. Consumers were announcing that they must shut down in a very short time if no coal was provided and it looked like a famine, but the weather eased up a little and coal began to move, though slowly.

As there is likely to be a return of the former differences soon in the varieties of coal it may be well to quote as before, but with a sharp addition of prices, as follows, per net ton, f.o.b. Buffalo:

| | |
|---|---|
| Youghiogheny Gas | $7.50@8.00 |
| Pittsburgh Steam | 7.25@7.50 |
| Ohio No. 8 | 7.25@7.50 |
| Allegheny Valley | 7.00@7.25 |
| Pennsylvania Smokeless | 7.15@7.40 |
| Cambria Co. Smithing | 7.10@7.35 |
| All Slack | 7.30@7.55 |
| Cannel | 7.40@7.65 |

**Anthracite**—Buffalo was not quite so badly off for coal as most of the districts beyond, but there have been several days when the local trestles were practically out of any size. Trains from this side proceeded unbroken to Canadian points, sometimes drawn by our locomotives, for the Canadian roads were worse off than ours and it was a matter of getting the coal to destination somehow. Independent anthracite sold at premiums of $2 or more when it could be had, though as a rule it was no plentier than any other.

The worst is probably over unless heavy snow falls, as it is easy to get the stalled cars out of the yards now. One company has had to furnish most of the anthracite distributed here for sometime, as the others were practically unable to get a supply.

### TORONTO

**Supplies coming forward more freely, but bituminous still very scarce. Local deliveries far behind. City supplying consumers with small lots.**

With the setting in of milder weather, conditions are beginning to show a slight improvement and supplies of anthracite are coming forward more freely. Owing to the shortage of bituminous Toronto University was closed and many manufacturing plants only partially operated. Dealers were so overwhelmed with business that they have generally refused to take fresh orders, delivery facilities being entirely inadequate. In order to prevent serious hardship the city has secured a supply of anthracite and established three yards from which coal is being sold in half- and quarter-ton lots at the rate of $9.50 per ton to those in actual need, deliveries being made by the street commissioners department. Dealers expect to resume taking orders very shortly.

### TOLEDO

**Supplies completely exhausted for a time and very drastic action was necessary to avoid acute suffering.**

This has been a desperate week with Toledo people so far as the coal situation is concerned. Monday the 10-below-zero mark was touched and previous to that Toledoans had suffered a 16-below temperature. As a result of the extreme weather Toledo domestic supplies gave out last week and, one after the other, Toledo coal concerns stopped taking orders. Allotments were gradually reduced until deliveries were being made in one-seventh ton lots but even these finally ceased and eventually the Mayor concluded to confiscate coal. Representatives of the railways finally agreed to turn over 50 cars of their own fuel coal to the dealers on the promise of the George M. Jones Co. that this would be restored to the railroads direct from their mines, immediately. This alleviated the suffering and the few warm days which have followed have helped matters some but dealers are still a week behind in their orders and with embargoes on the many different railroads still in force it is hard to say what the outcome will be.

### DETROIT

**Mayor of Detroit announces plan for forcing sale of coal on tracks. Dealers say coal is held by railroads' failure to deliver cars on sidings.**

**Bituminous**—Some of the wholesalers report a freer movement of bituminous coal to Detroit by way of Toledo, due to more favorable weather conditions. Receiving information that many families were without coal or had only a very scanty supply, Mayor Oscar B. Marx has taken drastic action in the matter and also declares that if necessary he is ready to resort to confiscation of the coal and will pay for it at the market price. Several local coal dealers pronounce the mayor's action an unwarranted interference with their business. They say legal measures will be taken to prevent interference with coal on tracks, which they claim is very often held to suit the convenience of the railroads.

An investigator sent out by the mayor reported finding several hundred cars on tracks in local railroad yards. The coal dealers explain that 700 to 1000 cars daily are needed for Detroit's requirements and say that 95 per cent. of the coal is sold before it arrives in the Detroit terminal. Consumers of steam coal are actively seeking stock to meet their needs and are taking all sizes. The quotation in general remains $5.50 at the mines for all sizes of bituminous.

Higher temperatures followed the zero weather early last week and saved many Detroit consumers of domestic coal from serious suffering, as the supplies in many retail yards had been exhausted. In some of the yards weeping women begged for coal that the dealers could not supply.

**Anthracite**—Shipments of anthracite are coming very slowly. In some parts of the city retail dealers are reported to be getting at the rate of $12 and $12.50 a ton on small orders. Embargoes on Eastern railroads continue to curtail Detroit's supply.

### COLUMBUS

**High prices and scarcity of coal the chief features of the trade. Output still further curtailed by railroad congestion.**

With a good demand from every source and restricted receipts the coal trade has been in a strenuous condition. Domestic users have been caused the most trouble as dealers have not been able to take care of current needs. With the mercury hovering around the zero mark last week the domestic demand was strong. Buyers are taking anything on which deliveries can be assured to a reasonable degree. Dealers have been able to give only small lots to their customers.

The steam trade has also been active and in many cases loaded cargoes have been confiscated by public intitutions and public service corporations. Some of the manufacturing plants have been compelled to close down because of lack of fuel, especially those in the northern part of the state. The principal trouble is the large number of loaded cars now blocking the coal roads; embargoes are the rule and many roads are cut off from traffic altogether. Production has been quite low. Some of the railroad officials believe that the situation can be relieved with better weather conditions, but most shippers believe the congestion will prevail for many weeks.

Prices on short tons, f.o.b. mines are as follows:

| | Hocking | Pomeroy | Eastern Ohio |
|---|---|---|---|
| Rescreened lump | $5.00 | $5.00 | |
| Inch and a quarter | 5.00 | 5.00 | $5.00 |
| Three-quarter inch | 5.00 | 5.00 | 5.00 |
| Nut | 5.00 | 5.00 | 5.00 |
| Egg | 5.00 | 5.00 | |
| Mine run | 5.00 | 5.00 | 5.00 |
| Nut, pea and slack | 4.75 | 5.00 | 5.00 |
| Coarse slack | 4.75 | 4.75 | 5.00 |

### LOUISVILLE

**Mild weather reducing demand for domestic coal. Steam requirements better filled, considerable continued car shortage and embargoes.**

Return of mild weather with the consequent let up in the demand for coal for domestic consumption has resulted in an easier feeling in the market. Steam requirements are still large, though better taken care of than for some time. Contracts continue to get the bulk of the coal shipped.

Southeastern Kentucky quotes lump and block, f.o.b. the mines, at $4.50 and mine-run and nut and slack around $4. Western Kentucky markets range from $3 for lump, $2.50 for mine-run down to as low as $2 for nut and slack.

### CINCINNATI

**More moderate weather has softened domestic demand, but the industrial situation is serious, on account of traffic conditions. No prospect of relief is in sight.**

Transportation conditions have been at the front in the coal trade this week. The serious condition resulting from the inability of the railroads to furnish cars or to move them when loaded, brought about a meeting of coal, transportation and other interests to discuss means of relief. The Chesapeake & Ohio embargo was lifted several days ago, but congestion at Eastern terminals is still preventing the movement of coal, and the car shortage has assumed a relatively unimportant place, in view of the inability of the railroads to get trains forward. The severe weather has prevented the movement of coal by river, so that the supply in the city is being reduced, and additions are of such small volume as to threaten a shortage.

Both coal and railroad men are pessimistic over the situation. Contracting is still in the future, as operators are still disinclined to commit themselves in view of their present inability to meet the demands on their old contracts. Prices are certain to break all records, however, a few contracts having been closed already at $3 per short ton f.o.b. mine, for mine-run and nut and slack.

### BIRMINGHAM

**Market strong for both steam and domestic grades. Consumers insistent on deliveries, shipment being urged by wire. Labor and car supply remain disturbing factor in increasing the production to meet requirements.**

Local brokers and producers are besieged with telegrams and letters urging deliveries. The class of labor employed at the mines is unsteady and inefficient to such a degree as to greatly retard the normal production and considerable time is being lost at the operations, particularly on the 'Frisco lines, for lack of equipment.

A strong spot market still holds sway and inquiries are being received from a wide range of territory from South Carolina to Texas, and it is reported that many points in the South are facing a coal famine. The railroads are consuming an enormous tonnage and have invaded the spot market to supplement their contract supply. One of the principal lines was making dilligent inquiry this week for 250 cars. It is impossible to place an order in the district for such a tonnage for spot delivery without prorating between several operations.

An official of a large producing company expressed the opinion that there would be no recession in prices any time soon and that he looked for stiffer prices to prevail by the first of July than now obtain. Schedules were slightly advanced during the week, and prices are about as follows per net ton mines: Pratt mine-run, $3.50@4; Big Seam mine-run, $2.50@3; Black Creek mine-run, $3.50@4; Carbon Hill mine-run, $3@3.50; Cahaba washed mine-run, $3.50@4.

The domestic market is good, with a large aggregate tonnage of small orders booked. Prices are stiff and retailers are buying very cautiously. Prices are as follows per net ton mines: Big Seam lump, $3.50; Carbon Hill, $3.75@4; Cahaba and Black Creek, $4.50; Montevallo, $4.50@4.75.

## Coke

### CONNELLSVILLE

**Car supplies worst in decade. Many blast furnaces banked. Spot prices higher.**

Car supplies in the Connellsville coke region last week were the poorest on record, or at least since the great railroad blockade of 14 yr. ago. Average allotments were reported at under 35%, but it must be remembered that the allotments were established long ago and the trade as a whole does not need anything like a 100% allotment, but probably 65 or 70%, to supply the blast furnaces still dependent upon Connellsville coke. The average capacity of cars furnished, however, has gone down from about 38 tons last October and earlier to about 32 tons at present, and percentages of allotments refer to number and not aggregate capacity. Last week's shipments may be estimated at not over about 50% of requirements.

This week has opened with very poor car supplies but the more moderate weather gives promise of better conditions by the end of the week. Spot prices at the moment are about $1 a ton higher than a week ago. Monday morning a sale of spot furnace coke was made at $13. The majority of furnaces do not think of buying spot coke but simply run slack or bank altogether when there is not enough coke.

We quote: Spot furnace, $12@13; contract, nominal, $6@8.50; spot foundry, $13@14; contract, nominal, $8@8.50, per net ton at ovens.

The "Courier" reports production in the Connellsville and lower Connellsville region in the week ended Feb. 10 at 302,933 tons, a decrease of 2095 tons, and shipments at 291,166 tons, a decrease of 13,737 tons.

**Buffalo**—The supply has decreased about as seriously as in case of coal, till some of the city consumers have been obliged to obtain a scant amount by carting it long distances over town. It is quite a long time since any unsold spot coke has been reported here and it will be spring at least before the supply is at all normal. Jobbers quote Connellsville foundry at $13 at the ovens or $14.85 f.o.b. Buffalo. Other grades are hardly quotable separately.

**Chicago**—The coke situation remains tight, and spot prices are so high that nobody is making an effort to secure tonnage outside of contracts. The demand constantly exceeds production, and new contracts are not being considered in the present state of affairs.

**St. Louis**—Local byproduct is off of the market at any price. The demand is exceptionally good, and several manufacturing plants are obliged to pay premium prices in the South and East for coke, or suspend operations. Gas house for domestic is also short, and no prices are quoted on any local coke. Shortage of coal at the local plants has decreased the tonnage.

**Birmingham, Ala.**—Coke is still being sought eagerly in the local market and spot foundry is quoted at $11 and $12 per net ton ovens with contract at from $8 to $10 per ton. The production is being increased slightly from time to time by the placing in commission of beehive ovens which have been in course of rehabilitation for several months. Every oven in the district that it is practical to recover is now being prepared for operation. Approximately 10,000 to 12,000 tons per month is being shipped into Texas and California territory, a small tonnage finding its way into old Mexico, there being no direct consignments to that territory.

## Middle Western

### GENERAL REVIEW

**Coal shortages universally felt. Transportation badly demoralized. Prices of all grades extraordinariily strong.**

Severe cold weather and storms have increased transportation difficulties, aggravated car shortage at the mines, and generally shortened the supply of coal at Western distributing centers. The zero weather has also kept the men away from the mines, and output has been curtailed accordingly.

Prices, if anything have strengthened, and in a number of instances advances are reported. Stiffer quotations have been made for spot sales of southern Illinois lump, egg and mine-run, and increased shipments of Indiana and Illinois grades have been made to Michigan and Ohio points at fancy figures. With the spot situation strong as the time rapidly approaches for making contracts for the new year from Apr. 1, increased reluctance is shown on the part of operators and wholesalers to enter into contract obligations.

Reduced stock in the hands of retailers has caused a considerable scramble for supplies. Embargoes have seriously retarded receipts of Eastern and Southern coals, but the lifting of the embargo on Pocahontas had a tendency to lower prices on smokeless grades about the middle of the week. The blockade of railroad terminals continues, and the transportation problem is likely to keep prices up for spring and summer buying.

Operating time at Illinois mines seems to be worse than at any time this season, and in Indiana chaotic conditions have existed. The Ohio River has been frozen over at many points, and southern Indiana towns have been extremely short of fuel. From all over the state the Governor has been implored by telegram and telephone to take drastic action to relieve a fuel famine. Much suffering has occurred at many Indiana points, and complaint is made that operators are shipping coal out of the state at fancy figures when the coal should be conserved for local points where serious shortages have existed. Very little Eastern coal is being received at Indiana points.

The shortage of coal in Cincinnati and Detroit reached a very serious stage this week and the Detroit Edison Co. was obliged for a short time to discontinue its power service. Appeals were made by newspapers to consumers of electricity, to economize, and a number of industrial plants using electric power closed down for a few days in an effort to relieve the situation.

No new developments have occurred in Lake vessel rates, but it is reported that 40c. has been offered without acceptance and it is rumored that some charters have been made at 42c. There are still a number of old 30c. to 35c. contracts in effect, which will take care of some interests for a short time. Considerable caution is being exercised in making shipments of bituminous coal from the docks, since it is realized that the tonnage of free coal above railroad requirements is becoming very scarce. Movement of all railroad coal to Northwestern points has been almost at a standstill, and the shortage is the worst in the history of that section in sixteen years' time.

Definite plans are being made by a number of large public service corporations, industrial plants and railroads to store an immense quantity of coal this spring and summer, and this will tend to maintain prices at a high level during the dull season. A number of these users will store coal under water.

### CHICAGO

**Receipts very scarce. Railroads unable to move shipments in terminals. Prices higher than last week.**

Receipts of southern Illinois coals have been comparatively small, owing to difficulties of railroad transportation and lack of empties and labor at the mines. The car supply has been averaging about 50 per cent. of requirements at the Franklin County mines; in Williamson and Saline Counties it has run about 35 per cent. and the carriers give little hope of improvement

for 60 days to come. Prices have been very stiff, and the call for coal from foreign territory such as Michigan, Ohio and Indiana has been heavier than at any time during the winter. There are hundreds of loaded cars from the Southern Illinois mines at every junction point awaiting movement. A few contracts have been reported under negotiations for steam sizes at high figures, and in one case it is said that southern Illinois operators refused $1.65 as a mine price for screenings on a contract for one year from Apr. 1, which compares with 85c. last year at this time. It is said the railroads have intimated that they will accept an advance of 50c. per ton in their contract requirements, but the shippers do not seem to be in a hurry to accept contracts on this basis.

Increased shipments from the central Illinois field have been made to Michigan, Indiana and Ohio points. Fulton and Peoria County mines are sold ahead for some time.

Strong pressure has been exerted on the Indiana mines for Chicago shipments this week but without receipts being increased. Prices have been stiff owing to extraordinary demands for Indiana coal from Michigan and Ohio points. Congestion of freight at many Indiana terminals has made it almost impossible to return empties to the mines, and the latter have been running about half time. Coal has been given the right-of-way over all freight shipments until Mar. 1.

No smokeless shipments were available until the middle of the week, when embargoes were lifted and the few scattered shipments arriving were sold at around $5. Retailers are placing orders only for immediate needs in an effort to break present high prices, but the weather is the controlling factor.

The demand for Hocking sizes has been strong, with very few sales made as most of the Ohio production is being absorbed at home. Some splint shipments commenced to arrive during the middle of the week.

Shipments of all-rail anthracite into this territory are of negligable quantity and Chicago is bare of supplies. Hundreds of cars of anthracite said to be en route to Chicago are held at various points and the railroads are unable to predict when they will be moved.

Quotations in the Chicago market are as follows, per net ton f.o.b. cars at mines.

| | Springfield | Fulton & Peoria Cos. | Clinton & Sullivan Cos. | Green & Knox Cos. | Carterville |
|---|---|---|---|---|---|
| Domestic lump | $3.50@3.75 | $3.50@4.00 | $3.50@3.75 | $3.50@3.75 | $3.75@4.00 |
| Steam lump | 3.25@3.50 | 3.00@3.50 | 3.00@3.25 | | |
| Egg | 3.25@3.50 | 3.50@3.75 | 3.25@3.50 | 3.25@3.50 | 3.75@4.00 |
| Nut | 3.25@3.50 | 3.00@3.50 | 3.00@3.50 | | |
| Mine-run | 3.25@3.50 | 3.00@3.25 | 3.00@3.25 | 3.00@3.25 | 3.75@4.00 |
| Screenings | 3.25@3.50 | 2.50@3.00 | 3.00@3.25 | 3.00@3.25 | 3.25@3.50 |

| | Wlmson. & Frankln. Cos. | Saline & Harrisburg | Poca. & W. Va. Smokeless | Penna. Smokeless | Eastern Kentucky |
|---|---|---|---|---|---|
| Lump | $3.75@4.00 | $3.75@4.00 | $5.00@5.25 | | |
| Egg | 3.75@4.00 | 3.75@4.00 | 5.00@5.25 | | |
| Nut | | 3.50@3.75 | | No arrivals | No arrivals |
| No. 1 nut | 3.75@4.00 | | | | |
| No. 2 nut | 3.75@4.00 | | | | |
| No. 3 nut | 3.50@3.75 | | | | |
| No. 1 washed | 3.75@4.00 | | | | |
| No. 2 washed | 3.50@3.75 | | | | |
| Mine-run | 3.50@3.75 | 3.25@3.50 | 4.75@5.00 | | |
| Screenings | 3.25@3.50 | 3.25@3.50 | | | |

Hocking Lump $4.00@4.25. Splint Lump $4.25@4.50.

### ST. LOUIS

**Car shortage the worst on record and warm weather is the only thing that prevents a runaway market. Congestion at all principal points. Steam demand strong, but domestic getting easier. Shipments of Eastern coals entirely suspended.**

Car supply in the Southern Illinois field has been the worst in the history of this territory. The only thing that has prevented a runaway market has been the spell of warm weather.

There has also been a cutailment of production at mines that are furnished equipment for railroad coal on account of petty strikes. The big mines of the Superior Coal Co., at Gillispie, were idle for a few days this week from this cause thus forcing the C & N. W. Ry. to go into the open market and buy upwards of 125,000 tons of coal. In other sections of the state there has been minor labor troubles, and in the Williamson-Franklin County field about 20 per cent time has been the average for all roads.

The demand for high-grade coal in St. Louis is easier both for domestic and steam, this demand being taken care of by coal from the Mt. Olive district chiefly. From the Standard field the local demand has been fairly good for domestic, and exceptionally strong for steam sizes.

The transportation problem is not due as much to a shortage of cars as to a congestion of traffic and lack of sufficient motive power. The river at St. Louis is open and the ferries are going, which is making conditions better locally.

Country demand is exceptionally good on the cheaper grades, and in many sections on the high grades, with screenings in the lead. Washed sizes are entirely off of the local market from all districts, being sold up.

Recent embargoes have eliminated any possibility of getting shipments of anthracite, smokeless or smithing coals from the East. There is no immediate prospect of easier conditions, even with mild weather, on account of the railroad difficulties.

The prevailing price at St. Louis is 25c. to 50c. under the country on most sizes, and is per net ton f.o.b. mines:

| | Williamson and Franklin Co. | Mt. Olive and Staunton | Standard |
|---|---|---|---|
| 6-in. lump | $3.25 | $2.85 | $2.75 |
| 3x6-in. egg | 3.25 | 2.75 | 2.75 |
| 2x3-in. nut | 3.25 | 2.75 | 2.50 |
| No. 2 nut | 3.25 | .... | 2.50 |
| No. 3 nut | 3.25 | .... | 2.40 |
| No. 4 nut | 3.25 | .... | 2.30 |
| No. 5 nut | 2.75 | .... | 2.00 |
| 2-in. screenings | 2.75 | 2.50 | 2.25 |
| 2-in. lump | ..... | ..... | 2.50 |
| 3-in. lump | ..... | 2.75 | ..... |
| Steam egg | ..... | 2.75 | 2.50 |
| Mine-run | 3.25 | 2.50 | 2.35 |
| Washed | | | |
| No. 1 | 3.50 | 3.25 | .... |
| No. 2 | 3.25 | 3.25 | .... |
| No. 3 | 3.25 | 3.25 | .... |
| No. 4 | 3.25 | 3.25 | .... |
| No. 5 | 2.75 | 2.50 | .... |

Rate on Williamson & Franklin Co. is 72½c. Rate on other fields is 57½c.

### MILWAUKEE

**Shortage very severe. Many industries compelled to suspend because of the lack of supplies. No contract business being negotiated.**

The coal situation at Milwaukee is in a state of chaos at the present time. Dealers are harassed to the point of desperation and are not inclined to give a moment's thought to future business and contract rates. Shortage of cars operates to prevent them from meeting the wants of customers in the interior of the state and many industries in the smaller towns have been forced to close down. There will be nothing doing in the way of reaching out for next year's trade until the month of April, by which time prices at the mines and rates of freight by lake will in all probability be established. Many dealers are refusing all orders from any but regular customers, as are the coke-producing companies. The supply of hard coal is dwindling fast, but there is sufficient soft coal on the docks to supply current demands.

## General Statistics

### IMPORTS AND EXPORTS

The following is a comparative statement of coal imports and exports of the United States for December, 1915-16, and for the 12 months ended December, 1914-15-16, in long tons:

| | December | | 12 Months | | |
|---|---|---|---|---|---|
| IMPORTS | 1915 | 1916 | 1914 | 1915 | 1916 |
| Anthracite, total | 173 | 151 | 19,347 | 2,998 | 5,693 |
| Bituminous, total | 175,023 | 112,074 | 1,375,316 | 1,521,237 | 1,530,212 |
| United Kingdom | 1,174 | 150 | 27,421 | 18,361 | 5,268 |
| Canada | 167,131 | 105,909 | 1,050,592 | 1,253,829 | 1,399,570 |
| Japan | 5,400 | 6,015 | 75,109 | 86,919 | 93,402 |
| Australia | 1,218 | ..... | 219,941 | 159,241 | 30,607 |
| Other countries | 100 | ..... | 2,253 | 2,887 | 1,365 |
| Coke | 4,047 | 1,170 | 120,777 | 47,520 | 49,067 |
| EXPORTS | | | | | |
| Anthracite total | 295,694 | 299,379 | 3,830,244 | 3,540,406 | 4,165,679 |
| Canada | 282,394 | 291,764 | 3,767,774 | 3,440,009 | 4,068,191 |
| Argentina | 57 | ..... | ..... | 2,526 | 1,530 |
| Brazil | ..... | 441 | 6 | 2,415 | 1,154 |
| Uruguay | ..... | ..... | ..... | 605 | ..... |
| Other countries | 13,243 | 7,174 | 62,464 | 94,851 | 94,808 |
| Bituminous total | 1,161,936 | 1,236,955 | 13,801,850 | 16,764,857 | 18,977,346 |
| Italy | 184,400 | 73,106 | ..... | 2,931,581 | 1,735,072 |
| Canada | 629,289 | 760,782 | 9,170,901 | 8,354,365 | 11,839,384 |
| Panama | 34,337 | 49,775 | 267,598 | 515,341 | 427,732 |
| Mexico | 14,343 | 10,584 | 359,802 | 279,013 | 196,547 |
| Cuba | 131,448 | 124,404 | 1,074,825 | 1,165,871 | 1,284,172 |
| West Indies | 62,164 | 68,179 | 552,600 | 534,925 | 477,365 |
| Argentina | 27,646 | 42,074 | 241,248 | 786,967 | 921,969 |
| Brazil | 38,831 | 28,849 | 278,026 | 648,303 | 782,094 |
| Uruguay | 6,107 | 2,529 | 76,088 | 158,201 | 152,732 |
| Other countries | 33,371 | 76,673 | 1,780,762 | 1,390,290 | 1,160,279 |
| Total coal | 1,457,630 | 1,536,334 | 17,632,094 | 20,305,263 | 23,143,025 |
| Coke | 73,036 | 101,728 | 592,487 | 799,562 | 1,048,790 |
| Bunker coal | 563,463 | 609,075 | 7,266,002 | 7,470,988 | 7,826,181 |

### ANTHRACITE SHIPMENTS

In spite of the labor shortage the shipments of anthracite for the first month of 1917, as reported to the Anthracite Bureau of Information at Wilkes-Barre, Penn., show an increase both over the preceding month (December, 1916) and over January 1916. They exceeded those of any month in 1916 except two—March and November—and of any previous January with the exception of 1913.

The shipments for January, 1916 and 1917, were as follows:

| | 1917 | 1916 |
|---|---|---|
| Phila. & Reading | 1,150,147 | 1,106,899 |
| Lehigh Valley | 985,830 | 1,018,098 |
| Central R. R. of N. J. | 618,188 | 623,860 |
| D., L. & W | 1,000,383 | 860,230 |
| Dela. & Hudson | 667,035 | 626,959 |
| Penn. R. R | 458,896 | 640,908 |
| Erie R. R | 683,047 | 666,994 |
| N. Y., O. & W. R. W | 164,675 | 175,020 |
| Lehigh & New Eng | 284,021 | 165,382 |
| | 6,012,222 | |
| Deduction | * 71,497 | |
| Total | 5,940,725 | 5,884,350 |

* Deduction: Tonnage reported by both C. R. R. of N. J. & L. & N. E. R. R.

### COAL MOVEMENT

The following statement of carloads of bituminous coal that originated on 53 railroads and of beehive coke on 11 roads in January, 1917, is compiled from reports received by the Geological Survey, Department of the Interior, by noon Feb. 15, 1917:

| District | Jan., 1917 | Dec., 1916 | Jan., 1916 |
|---|---|---|---|
| Pennsylvania (15 roads) | 188,161 | 173,914 | 204,417 |
| W. Va., Va., Md., and Ohio (11 roads) | 200,560 | 188,751 | 190,440 |
| Ill., and Ind. (13 roads) | 143,475 | 128,891 | 137,327 |
| Ky., and Ala. (6 roads) | 18,930 | 17,152 | 15,471 |
| Iowa, Tex., Colo., and Southwestern States (8 roads) | 22,590 | 20,197 | 19,900 |
| Total 53 roads | 573,716 | 528,905 | 567,555 |
| Beehive coke (11 roads) | 64,669 | 62,952 | 69,902 |
| Number of working days | 26 | 25 | 25 |

The increase in shipments of bituminous coal in January, 1917, compared with December, 1916, was 8.5%, and compared with January, 1916, was 1.1%. The average number of cars of coal per working day was 22,062 in January, 1917, against 21,152 in December, 1916, and 22,701 cars in January,

### NORFOLK & WESTERN

The following is a statement of coal handled by the N. & W. Ry. during January and the preceding two months in short tons:

| | November | December | January |
|---|---|---|---|
| Pocahontas | 1,475,740 | 1,335,822 | 1,428,291 |
| Tug River | 310,884 | 290,411 | 324,236 |
| Thacker | 245,621 | 242,020 | 279,944 |
| Kenova | 91,571 | 84,782 | 89,595 |
| Clinch Valley | 138,032 | 133,762 | 162,687 |
| Miscellaneous | 9,687 | 11,618 | 21,273 |
| Total N. & W. | 2,271,535 | 2,098,415 | 2,306,026 |
| Wlm. & Pond Ck. | 116,977 | 112,447 | 124,030 |
| Tug R. & Ky. R.R. | 51,436 | 48,653 | 55,312 |
| Other roads | 340,230 | 209,084 | 322,788 |
| Grand total | 2,780,178 | 2,468,599 | 2,808,156 |